



HAL
open science

Instituting the Common(s) in the Digital Age: Between Politics and Technology

Ludovic Bonduel

► **To cite this version:**

Ludovic Bonduel. Instituting the Common(s) in the Digital Age: Between Politics and Technology. Political science. Luiss Guido Carli, Rome, 2023. English. NNT: . tel-04271466

HAL Id: tel-04271466

<https://hal.science/tel-04271466v1>

Submitted on 27 Nov 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

Instituting the Common(s) in the Digital Age:
Between Politics and Technology

PhD dissertation in political theory submitted to the department of Political Science of LUISS Guido Carli for the degree of PhD in Politics: History, Theory, Science, May 2022.

Written by Ludovic Bonduel

Under the supervision of Sebastiano Maffettone (LUISS Guido Carli) and Sébastien Broca (University Paris 8)

The thesis was successfully defended on January 13th, 2023, in front of a jury composed of Emiliana de Blasio (LUISS Guido Carli), Laurent Jeanpierre (University Paris 1 Panthéon-Sorbonne), and Wiebe Bijker (Maastricht University).

Abstract

Since the 1990's, multiple social movements and intellectual works have invested the notions of "commons" in the plural and/or the "common" in the singular to formulate their aspirations and ideas, as well as to describe old and new practices breaking with today's dominant economic models, or even aiming to surpass the capitalist mode of production. The political and scientific discourses referring to the common(s) are immensely diverse and sometimes contradictory. Throughout this dissertation, I approach them through four main research questions, two of which are descriptive (question 1 and 3) while the two others are normative (question 2 and 4):

- 1) What are the different theories of the common(s)?
- 2) How should we conceive and institute the common(s)?
- 3) How do the different theories of the common(s) understand the relation between politics and technology?
- 4) How should we understand and institute the relation between politics and technology?

My research aim is twofold. On the one hand, it is to present and critically discuss the different theories of the common(s), while shedding a singular light on them by focusing especially on their understanding of the relation between politics and technology and the way it echoes older debates in critical theory. On the other hand, it is to develop a personal normative position that builds on the philosophies of Andrew Feenberg, Cornelius Castoriadis, Pierre Dardot and Christian Laval. Questioning theories of the common(s) through the prism of their understanding of the relation between politics and technology appears particularly relevant in that many of these theories assign a decisive and positive historical role to digital technologies such as personal computers, the internet, or 3-D printers. A particular conception of the relation between politics and technology can be defined as a position taken within (at least one among) three interrelated debates: (A) Techno-determinism vs. Constructivism, (B) Technocracy vs. Epistemic democracy, (C) Techno-philia vs. Technophobia. I consider all three debates, but my main focus is on debate (A). The dissertation is structured around a conceptual distinction between the industrial age (1780-1975) and the digital age, so as to analyse some of the main lines of restructuration of capitalism since 1975, discuss how they are analysed by theories of the common(s) and outline the continuities and discontinuities between these theories and older critical theories.

Chapter 1 discusses various theories of technology – that are primarily engaged in debate (A) – and the ways they relate to the question of autonomy in the industrial age.

Chapter 2 analyses some of the main lines of restructuration of capitalism in the digital age and its relation to previous critical discourses and social struggles. It also presents the rise of the commons discourse and how it responds to the digital age.

Chapter 3 critically discusses the different theories of the common(s) and classify them in three main groups: liberal theories of the commons, theories of the common(s) as a mode of production, the theory of the common as a political principle.

Contents

Acknowledgments	6
Introduction	7
<u>Chapter 1: Technology and Autonomy in the Industrial Age</u>	16
Technology	18
<u><i>Technè and modern technology</i></u>	
<u><i>Progress, determinism and substantivism</i></u>	
Determinism	29
<u><i>Karl Marx and technological determinism</i></u>	
<u><i>Jacques Ellul and technological determinism</i></u>	
Constructivism	44
<u><i>David Noble and the social construction of industrial technology</i></u>	
<u><i>Social Constructivism and Actor-Network Theory</i></u>	
<u><i>The limits of constructivism</i></u>	
Andrew Feenberg's Critical Constructivism	56
<u><i>Democratic rationalization</i></u>	
<u><i>Impure Reason</i></u>	
<u><i>Technosystem</i></u>	
Autonomy	70
<u><i>Castoriadis and the imaginary institution of society</i></u>	
<u><i>The project of autonomy</i></u>	
<u><i>Autonomy and the imaginary institution of technology</i></u>	
<u><i>Three perspectives on autonomy in the industrial age</i></u>	

<u>Chapter 2: Crossed Genealogies of the Digital Age</u>	94
Neoliberalism and Cognitive Capitalism	96
<i><u>1965-1975: a decade of crisis</u></i>	
<i><u>Neoliberalism</u></i>	
<i><u>Cognitive capitalism</u></i>	
<i><u>Neomanagement</u></i>	
From Free Software to Platform Capitalism	121
<i><u>A brief history of Free and Open Source Software</u></i>	
<i><u>Practices and Values of Free and Open Source Software</u></i>	
<i><u>Platform capitalism</u></i>	
<i><u>Frontiers of work</u></i>	
A Genealogy of the Commons Discourse	152
<i><u>Enclosures and progress</u></i>	
<i><u>Neoliberal enclosures and accumulation by dispossession</u></i>	
<i><u>Commons</u></i>	
<u>Chapter 3: Theories of the Common(s)</u>	168
Liberal theories of the Commons	170
<i><u>Elinor Ostrom's political economy of the commons</u></i>	
<i><u>Critiques of Elinor Ostrom's political economy of the commons</u></i>	
<i><u>Property as a bundle of rights and the commons as common-property</u></i>	
<i><u>Against property</u></i>	
<i><u>Yochai Benkler and commons-based peer production</u></i>	
The Common(s) as a mode of production	199
<i><u>The reformist perspective: Michel Bauwens & Vasilis Kostakis</u></i>	
<i><u>A new mode of production?</u></i>	
<i><u>The revolutionary perspective: Michael Hardt & Antonio Negri</u></i>	
<i><u>The techno-determinist perspective: Jeremy Rifkin</u></i>	

The Common as a political principle	230
<u><i>The political principle of the Common</i></u>	
<u><i>Institution and subjectivation</i></u>	
<u><i>Instituting praxis, the law of the common and the state</i></u>	
<u><i>Envisioning an economy of the commons beyond property</i></u>	
<u><i>The common and the relation between politics and technology</i></u>	
Conclusion	260
References	271
Annex Interview with Andrew Feenberg	287

Acknowledgements

First and foremost, I would not have been able to write this thesis without the institutional and financial support of LUISS Guido Carli. I want to thank all my professors and colleagues of the PhD programme in Politics for making my time spent in Rome so pleasant and constructive. I am especially grateful to Prof. Sebastiano Maffettone for his trust and supervision. I also want to thank the coordinator of the PhD programme, Prof. Thomas Christiansen, and the staff of the PhD office, especially Ms. Francesca Pandozy. I am very grateful to all my friendly PhD colleagues of the programme and would especially like to address a warm salute to Akif Cem Ozkardes, Paolo Pizzolo, Rolf Nijmeijer, Luca Carrieri, Kevin Kalomeni and Megan Foster.

I have also been extremely lucky to benefit from a long research visit at the CEMTI (Centre for the Study of Media, Technology and Internationalisation) of the University Paris 8. I could not possibly thank enough Prof. Sebastien Broca for his close supervision and academic support which have been crucial for me in the realization of this thesis. I would also like to thank all my research colleagues of the CEMTI and to express my gratitude to the co-directors of the centre, Alexandra Saemmer and Maxime Cervulle. I especially want to thank Kianoosh Yasaei and Adrien Péquignot for the stimulating conversations we have had and the feedback they provided on my work.

I have also had the chance to realize two short research stays during my second year as a PhD student: in the P2P Lab at Tallinn University of Technology and in the CETCOPRA (Centre for the Study of Techniques, Knowledge and Practices) at the University Paris 1 Panthéon-Sorbonne. I am very thankful to Vasilis Kostakis, Alekos Pantazis and Alex Pazaitis for welcoming me in Tallinn and giving me useful advice. My motivation for engaging in a research on digital commons initially came from the enthusiasm felt as I read the works of the P2P Foundation. I also want to express my gratefulness and my emotion as I think of Prof. Marina Maestrutti, who welcomed me at the CETCOPRA, about two years before passing away.

I would also like to thank the two external referees of my thesis for the time they devoted to read my work and for the deeply valuable feedback they provided me with.

I also want to address a warm salute to some of my extra-academic friends for their support during these years of research: Léonard Boillot, Vincent Derolez, and Aurélien Piffaretti.

Finally, I whole-heartedly thank my parents – Martine and Marc Bonduel – and my brother and sisters – Damien Bonduel, Margaux Bonduel Esbelin, and Alexandrine De Charon – for their love and support.

Introduction

“More powerfully than ever, yet under changed forms, the present demands a thinking of extreme situations in a correctly understood sense, precisely because the paradigms of the trenches, torture, and the camps no longer have any currency for the Euro-American world. The extreme that gives pause today is hidden in the routines of the permanent revolution, of which we know that it belongs to the momentum of progressive societies animated by money, desire, and envy and will sooner or later provoke a renewed counterrevolution of the political against the primacy of the economic.”

Peter Sloterdijk, *The Domestication of Being in Not Saved – Essays after Heidegger*, 2017, p. 94

I started my doctoral research in September 2017. In the subsequent years, the world has witnessed an increasing polarization of the political landscape undermining the pre-existing neoliberal consensus; the election of new and radicalization of already settled right authoritarian leaders around the globe in the aftermath of the 2016 US election (e.g., Trump, Duterte, Bolsonaro, Modi, Erdogan, Orban, Salvini); the rise of what appears as an epistemological chaos in public deliberation; powerful images of wild forests burnt to ashes by millions of hectares in various parts of the planet (e.g., Australia, Amazonia, Siberia, Indonesia, California); new and more desperate “World Scientists’ Warning to Humanity” calling for urgent action against the multiple and aggravating environmental disasters (Ripple et al. 2017); a series of massive social or insurrectionary movements aiming for deep institutional changes (e.g., Chile, Lebanon, France, Hong Kong, Catalonia, Algeria, Iran, Iraq, United States) which were generally met by brutal repression; a global pandemic which led to unprecedented restrictions over social and economic life, and stimulated both the deepening of economic inequalities and the progress of the digital economy. Finally, the invasion of Ukraine by Russian troops is now shaking the foundations of the international order and making the threat of global nuclear annihilation increasingly tangible. A brief recollection of some of the significant events of the last couple of years suggests that history seems to be “accelerating” and that an era which opened in the late 1970’s may be about to end, for better or for worst. It is against this backdrop that I engaged myself in a research about the various critical discourses and theories promoting

the commons in the plural or the common in the singular as the central locus of the political alternative to oppose to today's dominant institutions. I attempted to write the pages that follow in a way that remains strictly in line with the academic standards of a PhD dissertation, while maintaining a tone and argument that conveys and grapples with the heart-stopping stakes of the time. I hope the reader will find the result satisfactory and that this work will make a modest contribution to the understanding and promotion of ideas that I deem meaningful, and possibly, emancipatory.

The political reference to the “commons” in the plural and the “common” in the singular became central within the social movements that emerged in the 1990's to contest neoliberal globalization. The multifaceted “movement of many movements” (Klein 2001) that came to be known as “alter-globalism” made an abundant use of this terminology to oppose what it identified as a core characteristic of neoliberalism: the private appropriation of multiple resources that were formerly owned by states, communities, or beyond the realm of property. In western history, the term “commons” referred to resources (e.g., pastures, forests, paths, rivers) belonging to and managed by local peasant communities as well as collective use rights over privately-owned resources. Commons were widespread in Great Britain and Europe in medieval times and central to the subsistence of rural populations. They were enclosed by feudal lords and royal families through different waves extending from the 16th to the late 19th century. The enclosures have been a founding moment of modern times in many respects, but they also represent a brutal and traumatic movement of expropriation which has often been considered as a “revolution of the rich against the poor” (Polanyi 1944, p. 37). The reference to the commons enabled social movements to denounce neoliberal privatisations and further extensions of property rights (especially intellectual property rights) as new enclosures. The conceptual opposition commons/enclosures also aimed to open a space of reflection beyond the dualism public/private property or State/market, which appeared increasingly sterile to many. It reflected a certain suspicion against the State owing both to the disasters associated to the history of the Soviet Union and to the new role and form the State was starting to take under the influence of neoliberalism. In that, the critical discourses referring to commons appear to inherit mostly from the libertarian trend of the history of socialism as opposed to the social-democrat and the authoritarian-leninist trends. Furthermore, the positive valuation of a pre-modern economic institution signalled a certain distance taken with some of the most epic narratives of progress and modernisation, in a context of rising environmental concerns.

The famous works of Elinor Ostrom have also attracted significant public and academic attention on the commons. They demonstrated that natural resources can sometimes be efficiently and sustainably managed by local communities beyond the reach of central governments and market exchange. In doing so, they undermined ancient liberal and recent neoliberal attacks against the alleged inefficiency and destructive character of any form of collective ownership and management, which had been central to the promotion of private property as the institutional foundation of markets. In the same period, the diffusion of personal computers and internet access encouraged an unprecedented boom in information exchange and sharing at global scale. Such information production and communication was essentially undertaken for non-market purposes by individuals alone or in loose collaboration with others. The new forms of collaborative production developing online were exemplified by the rising

movement of free software. It appeared that thousands of volunteers were able to work together on complex economic projects and produce high-quality informational goods that they would share as “commons” (e.g., GNU/Linux, Mozilla Firefox, Apache, MySQL, VLC, Wikipedia). The success of free software even started to threaten the proprietary software industry which would depict it as a “cancer” (Steve Ballmer, Microsoft’s ex-CEO in Greene 2001). The promotion of information circulation against intellectual property, central to the hacker ethic, came to inspire social movements and foster hopes for a new form of information-based communism (Hardt & Negri 2000, Gorz 2003, Bauwens 2005). Others saw in it a potential to regenerate and improve capitalism by transforming the organisation of labour and developing a more democratic public sphere (Benkler 2006; Himanen 2001).

Multiple academic and theoretical works have been written on commons (especially natural and information commons), generally understood as resources shared and managed by a community through the rules it creates (Bollier 2014, p. 27). This wide literature aims to clarify the economic functioning of commons, their associated culture, or their transformative potential. On the other hand, the term “common” in the singular also emerged within the context of alter-globalism (e.g., Cochabamba water war, see Sauvêtre 2019) and surfaced within posterior social movements (e.g., 15-M, Occupy, Nuit Debout). The term is not always precisely defined. It has been used as an adjective or a substantive and raised as a banner to promote shared use against private property, cooperation against market competition, and democratic models of governance against hierarchical structures. Michael Hardt and Antonio Negri (2004, 2009) have published important works proposing a more sophisticated theorization of the concept. A few years later, Pierre Dardot and Christian Laval (2015) have proposed an alternative understanding of the common.

The political and scientific discourses referring to the common(s)¹ appear immensely diverse and sometimes contradictory. They may rely on different epistemologies and ontologies, promote different normative and strategic views, distinct anthropologies and historical narratives etc. In this dissertation, I approach them through four main research questions, two of which are descriptive (questions 1 and 3) and two of which are normative (questions 2 and 4):

- 1) What are the different theories of the common(s)?
- 2) How should we conceive and institute the common(s)?
- 3) How do the different theories of the common(s) understand the relation between politics and technology?
- 4) How should we understand and institute the relation between politics and technology?

My research aim is twofold. On the one hand, it is to present and critically discuss the main theories of the common(s), while shedding a singular light on them by focusing especially on their understanding of the relation between politics and technology and the way it echoes older debates among critical theorists of politics and technology. On the other hand, it is to develop a personal normative position which will inscribe itself in the tradition of libertarian socialist

¹ The expression « common(s) » refers to both the common and the commons.

political theory and, more specifically, build on Andrew Feenberg's philosophy of technology and the political philosophies of Cornelius Castoriadis, Pierre Dardot and Christian Laval. The descriptive and normative dimensions of the dissertation are tightly woven since the critical discussion of existing theories will allow me to progressively elaborate my own position.

I believe that questioning the different theories of the common(s) through the prism of their respective understanding of the relation between politics and technology can make an original and interesting contribution to the existing literature. This research sets in at the intersection of four different bodies of literature: the first one is composed of critical theories of technology (e.g., Marx, Ellul, Gorz, Castoriadis, Feenberg), the second one contains the more empirical literature of science technology and society (STS) studies (e.g., Noble, Bijker, Pinch, Latour, Callon), the third one is composed of the various theories of the common(s) (e.g., Ostrom, Hardt et Negri, Dardot et Laval), and the fourth one is composed of works of synthesis attempting to present, map and classify the different theories of the common(s) (e.g., Papadimitropoulos 2020, Vercellone et Giuliani 2019, Bollier 2014, Jourdain 2021). Most theories of the common(s) have a sophisticated understanding of technology, often inspired by a careful reading of the critical theory and STS bodies of literature. Many of them assign a decisive and positive historical role to digital technologies such as personal computers, the internet, or 3-D printers (e.g., Benkler 2006; Kleiner 2010; Kostakis et Bauwens 2014; Rifkin 2014). However, I have found no work of synthesis that systematically questions theories of the common(s) through the angle of their respective conception of the relation between politics and technology. This research intends to fill this gap.

My point of departure regarding this issue was the diagnosis that, among the theories of the common(s) aiming for a post-capitalist economy, some conceive the latter as a *necessary* outcome of the development of digital technologies (Bowyer 2004; Rifkin 2014), others conceive it as a *possibility* arising from digital technologies but which will require significant social struggles (Bauwens, Kostakis, et Pazaitis 2019; Kleiner 2010), while others only insist on the importance of social struggles and are much less concerned with digital technologies (Dardot et Laval 2015). Furthermore, the question of technology has been central within the history of the workers movement and socialist thought since the first industrial revolution. It can thus be of interest to examine the continuities and discontinuities between current debates among theories of the common(s) and older debates between socialist theories and to what extent they reflect continuities and discontinuities in the actual evolution of the sociotechnical context.

Beyond the focus on the relation between politics and technology, this dissertation will present and discuss other central issues and debates among theories of the common(s). Another key debate which will have to be addressed concerns the relation between the common(s) and property: should we conceive and institute the common(s) within or against property, as common-property or non-property? Needless to say, this debate also inherits from centuries of socialist theories and practices.

The dissertation is structured around a conceptual distinction between the "industrial age" and the "digital age". The concept of digital age is designed to highlight and analyse some of the main lines of restructuration of capitalism and society that have occurred since 1975. It

thus establishes a contrast with the previous period – the industrial age (1780-1975). This contrast should not be overstated: industrial production still plays a decisive role in today’s economies and societies and so does industrial modes of organization and thinking. I do not either intend to claim that our historical situation is mainly characterized by the centrality of digital technologies, by opposing the notion of digital age to major concepts – such as the “Anthropocene” (Steffen et al. 2011) or the “Capitalocene” (Moore 2017) – that have been developed to describe our time. I consider that the transformations of capitalism and society since 1975 are deep and significant, but the aim of this conceptual distinction is not so much to make a claim about their magnitude. Rather, it is to focus the analysis on some elements of the present sociotechnical context whose significance I want to question and assess. Most theories of the common(s) strongly emphasize the importance of the transformations of capitalism that occurred since the last fourth of the 20th century, by approaching them in terms of “neoliberalism” (Dardot et Laval 2010), “cognitive capitalism” (Giuliani et Vercellone 2019; Hardt et Negri 2009), “networked information economy” (Benkler 2006), “peer-to-peer” (Bauwens, Kostakis, et Pazaitis 2019) or “third industrial revolution” (Rifkin 2014). Their respective understanding of the role of digital technologies in such transformations also varies significantly. Therefore, structuring my argument around the conceptual distinction between the industrial and the digital age, should allow me, on one hand, to better understand the social context in relation to which these theories emerged, and on the other hand, to critically discuss the analysis they make of this context.

Questioning the relation between politics and technology first requires defining both concepts. These notions will be extensively discussed in chapter 1, but I may sketch already the way I approach them. I adopt the definition of politics given by Castoriadis (1996). Politics (*la politique*) differs from the political (*le politique*). The political necessarily exists in every society. It refers to everything that concerns explicit power defined as “the instituted instance (or instances) that is (or are) capable of issuing sanction-bearing injunctions and that must always, and explicitly, include at least what we call a judicial power and a governmental power”² (Castoriadis 1996). On the contrary, politics is a rare and fragile socio-historical creation which only emerged on two occasions in world history: in ancient Greece and western modernity. It can be defined as the collective, explicit and lucid activity that questions existing social institutions and attempts to establish just ones. Following Castoriadis, I take the notion of “social institution” in an extensive sense comprising all that has been created (or instituted) by society; that is, not only political institutions (the legislative, judiciary and governmental branches plus the state’s bureaucratic apparatus), but also languages, customs, norms, technologies, religions, ideologies, arts etc³. My approach to the notion of technology comes

² The existence of an explicit legislative power is not a universal necessity according to Castoriadis (1996). Indeed, he notes that in “archaic societies” the legislative function has often been buried under customary obligations originating from a tradition with undefined origins. It did not represent an explicit power since it was indissociable from the implicit, anonymous and unconscious production of social norms.

³ A social institution can be more precisely defined as “a socially sanctioned, symbolic network in which a functional and an imaginary component are combined in variable proportions and relations” (Castoriadis 1975, p. 197). However, this definition calls for a detailed explanation which will only come at the end of chapter 1 as I present Castoriadis’ social ontology (see “Castoriadis and the imaginary institution of society”).

from the ones of Castoriadis and Feenberg, which I will argue are compatible. Technology refers to “an elaborate complex of related activities that crystallizes around tool -making and -using in every society” (Feenberg 1992). It is informed and characterized by an instrumental rationality which, far from having an extra-social essence as some philosophers have argued (Heidegger 1954), is always necessarily biased by specific values and interests as it gets contextualized in a particular social environment. Technological rationality is thus non-essentialist, impure and sociotechnical as we shall see⁴.

A particular conception of the relation between politics and technology, such as the one I will endorse and the ones I will try to identify within the different theories of the common(s), can be defined as an explicit or implicit position taken within (at least one among) three interrelated debates: (A) technological determinism vs. constructivism; (B) technocracy vs. epistemic democracy; (C) techno-philia vs. technophobia. I present these three debates as alternatives between two poles for the sake of clarity but, clearly, there is an indefinite number of possible positions in these three debates and they do not always range neatly as different degrees along a simple axis. I try to consider all three debates in the dissertation, but my main focus is on the first one.

(A) *Technological determinism vs. constructivism*: technological determinism can be defined as “the idea that technology develops as the sole result of an internal dynamic, and then, unmediated by any other social influence, molds society to fit its patterns” (Winner 1980). It can be decomposed in two propositions: unilinear progress and determination by the base (Feenberg 1992). The first proposition asserts that technological progress is unilinear, that it follows a single fixed track from less to more advanced configurations. The second is that social institutions are moulded by the technological “base” as they must adapt to its functional imperatives. Constructivist sociology of technology has provided multiple empirical evidence contradicting the thesis of unilinear progress, by insisting on the numerous and contingent social choices that guide technological development. Still, some theorists of the commons maintain a strong techno-determinist position (Rifkin 2014). Furthermore, acknowledging that technology is socially constructed – that its development is influenced by social choices – only contradicts the first proposition of techno-determinism. It does not mean that existing technologies (technical objects, disciplines, organisations) are neutral means to independently defined ends, that they carry no social weight. On the contrary, if they are socially constructed, they must carry social values and interests. The debate on techno-determinism thus extends in a discussion on the type of constraints and influences that existing technologies may exert on society and how such constraints may delimit the scope of the politically feasible. For instance, to what extent industrial machinery, shaped by centuries of capitalist relations of production, is compatible with worker self-management?

(B) *Technocracy vs. epistemic democracy*: This debate concerns the respective role of lays and experts in politics. According to technocratic discourses, political decision-making

⁴ Chapter 1, “Impure Reason”

can be reduced to technical expertise and political power should thus be endorsed by technical experts. Rather than regarding politics as the expression of irreducible conflicts between divergent values and interests, technocratic discourses claim that it can be reduced to an axiologically neutral expertise reflecting an extra-social technological rationality. Against this extreme faith in experts, the other extreme pole is not so much epistemic democracy than epistemic relativism⁵. Epistemic relativism goes further than the recognition that science is a social activity immersed in and limited by a specific context, rather than a “a view from nowhere, a God’s-eye view of the universe” (Feenberg 2017, p. 5). It considers that scientific knowledge has no privileged access to reality relatively to other sorts of discourse (e.g., religion) and that it has no more than a local validity. Some left-oriented postmodern discourses in philosophy and cultural studies (Dubois 1998) have promoted epistemic relativism since the 1980’s, in the hope to undermine different forms of social domination (e.g., patriarchy, racism). More recently, epistemic relativism came back in a far-right and conspiracy-fascinated version typified by Donald Trump and QAnon. Technocracy considers that experts should monopolize political power and accuse lays of pure irrationality. Epistemic relativism denies to experts’ voice any specific authority in public deliberation as it denies the specific value of scientific rationality. Epistemic democracy stands between these two poles and aims “to bring sciences into democracy” (Latour 2004). There are multiple conceptions of epistemic democracy, but they all attempt to develop a constructive dialogue between lays and experts while conferring a monopoly over rationality to none.

(C) Techno-philía vs. technophobia: Techno-philía can broadly be understood as a general attitude of sympathy towards technology and optimism regarding technological progress. I propose to define it more precisely as the idea that social progress is necessarily tied to technological progress, conceived as the development and spread of more complex and efficient technical knowledge and instruments. Techno-philía often comes with a social imaginary of material abundance that can be referred to as cornucopian. Cornucopia is the Latin term for the mythical horn of plenty (“*cornu*” = “horn” and “*copiae*” = “abundance”). Cornucopianism is the view that continuous economic and demographic growth pose no environmental problems that cannot be solved by technology. Conversely, technophobia can broadly be understood as a general attitude of suspicion towards technology and pessimism regarding technological progress. It tends to associate the most advanced technologies with various social ills such as atomisation, loss of freedom, environmental degradation, health problems, cultural regression etc. Countless arguments and views can be seen as more or less technophobic. The most extreme technophobic positions (e.g., anarcho-primitivism) claim that the problematic turning point in human history was the

⁵ I have chosen to term this debate “Technocracy vs. epistemic democracy” rather than “Technocracy vs. epistemic relativism”, because the notion of epistemic relativism is not directly concerned with the political. However, it has extremely important – though indirect – political implications. Indeed, if the voice of experts is completely discredited in the public sphere, the reality of climate change for instance, becomes a simple matter of opinion that anyone can express on an equal footage. Therefore, I am not so much interested in epistemic relativism for itself, but for its indirect political implications.

invention of agriculture characterizing the Neolithic revolution. Others consider the industrial revolution to be the problematic turning point and seek a return to pre-industrial societies. Less extreme technophobic positions can be more sympathetically portrayed as aiming for technological sobriety. They reject the cornucopian idea that technology can solve every environmental problems, highlight the social problems associated to specific technologies and consider their expansion should be limited from the outside rather than transformed from the inside. For instance, they may consider putting limits to the expansion of connected devices and objects associated to the “Internet of Things”⁶ (IoT), rather than simply aiming to make their design more “open”, “transparent”, democratically or user-controlled.

⁶ The Internet of Things is the network of physical objects that are embedded with sensors and software for the purpose of connecting and exchanging data with other devices and systems over the Internet.

The dissertation is divided into three chapters:

Chapter 1, entitled “*Technology and Autonomy in the Industrial Age*”, will critically discuss various theories of technologies – that are primarily engaged in debate (A) between techno-determinism and constructivism – and the ways they relate to the question of autonomy in the industrial age. Autonomy is to be understood here as the socialist ambition to radicalize democracy in the political sphere and extend it to the economic sphere by the establishment of a society of “freely associated producers”. The chapter will set the stage for the rest of the discussion by defining essential concepts (e.g., technology, techno-determinism, technosystem, capitalism). It will give an overview of different conceptions of the relation between politics and technology which emerged in an industrial context, critically discuss them, and start to develop one based on the combination of the philosophies of Andrew Feenberg and Cornelius Castoriadis.

Chapter 2, entitled “*Crossed Genealogies of the Digital Age*”, intends to give some substance to the concept of digital age by analysing some significant elements of the restructuration of capitalism, technology and society since 1975. In doing so, it will insist on the relation between this restructuration and the social struggles of the late 1960’s/early 1970’s which promoted the ideal of autonomy. The chapter further explores the different business models which developed in reaction to digitalization and the free software movement. Finally, it presents the emergence of the reference to the commons in political discourse and academic research. Overall, the chapter aims to propose an analysis of the digital age, highlight that the critical discourses referring to the common(s) emerged in response to this sociotechnical context, and critically discuss the different ways in which theories of the common(s) (e.g., Hardt et Negri, Dardot et Laval) have interpreted this context.

Chapter 3, entitled “*Theories of the Common(s)*”, presents and critically discusses the different theories of the common(s) and insist on their different understandings of the relation between politics and technology. The structure of the chapter provides a typology of theories of the common(s), classifying them into three main groups: liberal theories of the commons, theories of the common(s) as a mode of production, and the theory of the common as a political principle. Liberal theories of the commons consider that commons are and should remain compatible with capitalism, whereas the two other types of theories consider that common(s) can and should form the base of an alternative to capitalism. Theories of the common(s) as a mode of production all inherit in a singular way from the Marxist theory of history and avoid its most problematic aspects (techno-determinism, technocracy, technophilia) with different success. The theory of the common as a political principle, developed by Pierre Dardot and Christian Laval, has strong affinities with the political theory of Cornelius Castoriadis, adopts its ontology of the “social-historical” and largely inherits from its critique of Marxism. The chapter argues in favour of the theory of the common as a political principle, highlights its proximity with the works of Castoriadis and explores its compatibility with the philosophy of Andrew Feenberg.

Chapter 1: Technology and Autonomy in the Industrial Age

“Science discovers, genius invents, industry applies, and man adapts himself to, or is molded by, new things . . .”

Slogan of the 1933 Chicago World’s Fair

“Recently, the dream of abolishing the modern curse of labour has taken the form of ‘self-management’ and ‘participation’ to the direction of enterprises. [...] But to realise them, it will not be enough to establish them by decree, the true revolution will have to address the nature of industrial labour itself. What kind of Taylor, inspired this time by freedom, will find the scientific and technical means to render such labour more intelligible, less divided and centralised? And, in that case, won’t it be necessary to partially sacrifice productivity, power and even the comfort of men to their happiness?”

Bernard Charbonneau, *Prométhée Réenchaînée*, 1972, p. 144

In this chapter, I will discuss a set of problems related to technology, technological determinism, and autonomy in modern industrial societies: what is technology? How does technology relate to society in general and politics in particular? What is technological determinism and does it come in different versions? And can principles of autonomy and democracy be extended to the sphere of work in industrial societies? These questions are different but closely related. Economic democracy, the replacement of the exploitation of labour by capital and of the authority of managers over workers, by a society of freely associated producers has been one of the main ways to understand the ideal of socialism. As Andrew Feenberg (1992) remarked, “democratic political theory offers no persuasive reason of principle to reject it”. Most often, it simply assumes that it is incompatible with modern technology and thus cannot be reasonably pursued. This assumption implies that modern technology has a weight, a certain capacity to shape social structures. It is thus related to (though it remains

different from⁷) the idea of technological determinism. Questioning the interactions between technology and society thus seems like a good point of entry to address the issue of economic democracy.

Throughout the chapter, I will critically discuss various theories of technology – that are primarily engaged in debate (A) between techno-determinism and constructivism – and the ways they relate to the question of autonomy in the industrial age. My argument will favour the theories developed by Andrew Feenberg and Cornelius Castoriadis, highlight their affinities, and propose to integrate them within a common philosophical framework. In line with these authors, I will argue that it was possible and desirable to extend the ideal of autonomy to the sphere of work in the industrial age. The core conclusions of the many works written by scholars of science and technology studies (STS) since the 1980's as well as Andrew Feenberg's philosophy of technology – which builds on them – seem fundamentally compatible with the philosophy of Cornelius Castoriadis. They tend to confirm and precise some of his claims by insisting that technological development is not autonomous from society but – to the contrary – shaped by the particular interests and worldviews which compose it.

Following Castoriadis, I approach history – the self-alteration and self-institution of society across time – as a process which cannot be fully reduced to patterns of causal determinism as it involves absolute creation originating from radical imagination. The instituting process takes place in a specific context, based on what is already instituted, but it is not simply caused or determined by it. From this perspective, technological development appears as a dimension of this process of self-institution while technology becomes a social institution among others. On the one hand, it is part of the instituted and – as such – forms the conditions in which the instituting process occurs without determining it. On the other hand, technological development is a dimension of the instituting process, which is more constrained by functional imperatives but remains pervaded with imaginary significations. As any social institution, technology tends to escape society's control, to function by itself and impose its laws upon society. Therefore, the project of autonomy (understood as the lucid and explicit self-institution of society) can and should be extended to the field of technology while considering its specificities. Technology can be consciously transformed and there is no reason to think it is intrinsically incompatible with economic democracy. Instituting economic democracy and radically transforming technology does not represent an easy endeavour: the instituted resists, has a strong inertia, and this is even more true for material structures or organisational methods. Nonetheless, it is constantly infused by the instituting and can sometimes be deeply shaken by it within a short time span.

⁷ The disbelief in the possibility of establishing democratic worker self-management is a widespread opinion, which does not imply that technology develops autonomously and shapes major aspects of societies. Hannah Arendt for instance – who clearly cannot be considered techno-determinist in any way – could write: “It is quite doubtful whether the political principle of equality and self-rule can be applied in the economic sphere as well. It may be that the ancient political theory, which held that economics, since it was bound up with the necessities of life, needed the rule of masters to function well, was not so wrong after all” (Arendt 1958b).

Technology

Technè and modern technology

The concept of technology is complex and ambiguous; or “hazardous” as Leo Marx (L. Marx 1997) puts it. Nonetheless, it remains inescapable as it points to an essential dimension of humaneness, which took an even greater importance in modern societies. Indeed, anthropologists often present tool-making and language as the two most fundamental human characteristics that enable to distinguish our species from other animals (Dusek 2006, p. 112). Yet, the use of the term “technology” in today’s broad sense is rather recent, as Leo Marx noted⁸. Until the mid-19th century, the knowledge, artefacts and practices later to be embraced by the word “technology” were described as a branch of the arts known as the “mechanic”, “practical” or “industrial” arts, as opposed to the fine arts. The “practical arts” referred to the knowledge and practice of the crafts and was a much more limited category than “technology” has become since. This semantic evolution reflects a change in the representation of instrumental practices that can only be understood in relation with the considerable social changes that followed the industrial revolution. As Leo Marx remarked, the “term ‘mechanic arts’ calls to mind men with soiled hands tinkering with machines at a workbench, whereas ‘technology’ conjures up images of clean, well-educated technicians gazing at dials, instrument panels, or computer monitors”. The word “technology” first emerged in the English language in the 17th century but it was quite uncommon and only referred to technical discourses and treatises. Until the 1880’s, the use of the term in its current broad sense was scarce: Karl Marx or Arnold Toynbee for instance rarely used it in spite of the close attention they gave to new machine power. Yet, the founding of the Massachusetts Institute of Technology in 1861 testifies of its progressive recognition.

The word “technology” is derived from the Greek notion of “*technè*”. “*Technè*” originally referred to “production” and “material fabrication” but quickly extended to efficient-doing/making in general (not necessarily related to material fabrication), to the form of action required in production, the human ability enabling it, and to efficient methods and know-how (Castoriadis 1980). Alongside the rapid emergence of this first derivation of meaning (from the idea of fabrication to the one of efficient know-how), another one associating material fabrication (*technè*) with creation (*poiesis*) progressively developed before being definitively established by Aristotle. In Plato’s “Symposium”, *poiesis* is described as “the cause that brings from non-being into being anything we may consider” while “all the products of *technè* are *poiesis* and their producers are all poets [creators]” (205b). In short, *technè* is a form of *poiesis*. For Aristotle, *poiesis* (creation) and *praxis* (action) both belong to the domain of what could be otherwise, of what is possible as opposed to what is necessary. However, *praxis* is to itself its own end whereas *poiesis* aims to create a work (*ergon*), that exists independently from the activity from which it originates and whose value surpasses the one of this activity. *Technè* consists in a set of practical skills that can be acquired by individuals, it is a “creative state involving true reason” (Nicomachean ethics, VI, 4). What is the extent of such a creation? Castoriadis insists that the idea of creation remained very limited in antiquity and that its scope

⁸ The French notion of “*Technique*”, equivalent to the English word “Technology” in its modern broad sense, emerged in the same period: late 19th and early 20th century.

was never fully grasped by philosophers until our days (until his works to be precise). Indeed, Plato considered ideas (*eidōs*) are eternal and immutable. From this perspective, the creation of the craftsman only consists in assembling materials in a way that actualizes an eternal form: the craftsman does not create the idea of a chair but realizes it in the material world. For Aristotle, “*technè* in general, either imitates nature (*physis*) or accomplishes what nature is incapable to achieve” (Physis, II, 8). Although this sentence can give the impression that *technè* surpasses nature, such interpretation would be mistaken (Bourg, 2006). When men create what nature is unable to achieve, they deploy their own nature of creators and realize possibilities that are naturally given. Aristotle affirms that “if a house was produced by nature, it would be produced in the same way that *technè* actually produces it” (Physis, II, 8). In Aristotle’s view, *technè* is not superior but inferior to nature. Indeed, the association between form and material is precarious and superficial in man-made products if we compare them to the products of nature. Such association is imposed by men from the outside, whereas it results from an internal principle in the natural world: animals and plants can self-reproduce while beds and chairs cannot.

Moreover, *technè* is closely related to *épistèmè*; a notion usually translated by the word “science”. The two terms were used as quasi-synonyms for some time (including by Plato) and referred to a rigorous and specialised knowledge which can be learned. However, Aristotle clearly distinguished them: while *technè* engages with the possible (what man can create or not), *épistèmè* engages with the necessary: the knowledge of the eternal and necessary laws that govern nature. This distinction justified the clear-cut separation between *technè* and *épistèmè* that ruled the antique world and profoundly limited technological development. *Epistèmè* represented a noble activity elevating men to the contemplation of the necessary laws of the divine *cosmos*, whereas *technè* would bring them back to the routine practices of craftsmen. Finally, *technè* also included the fine arts which aimed to create works of beauty. For this reason, the Latin translation of “*technè*”, that is “*ars*” (which later gave the word “art”), comprised both mechanic and fine arts.

Modern technology differs from *technè* and premodern crafts in countless respects but we may outline a few important differences here. First, the representation of nature that came with modern science tends to deprive it from any ethical dimension and to encourage unrestricted instrumental practices: “The science of nature develops under the technological *a priori* which projects nature as potential instrumentality, stuff of control and organization” (Marcuse 1964). To the contrary, Aristotle and ancient Greeks did not separate science and ethics, the “is” and the “ought”: men belonged to a divine *cosmos* where each entity had inherent ends and they could only contemplate the world to understand their place within its order. Nature as an object of science radically differs from the nature directly experienced by our senses. Hannah Arendt for instance, argued that:

“*The modern age began when man, with the help of the telescope, turned his bodily eyes towards the universe, about which he had speculated for a long time [...] and learned that his senses were not fitted for the universe, that his everyday experience, far from being able to constitute the model for the reception of truth and the acquisition of knowledge, was a constant source of error and delusion*” (Arendt 1961).

Galileo's discovery that – contrarily to what our senses suggested – the earth revolves around the sun, represents according to Arendt the fundamental experience underlying the Cartesian doubt, and beyond, the modern relation to (and alienation from) the world. This detachment from our sensual experience largely explains why we tend to picture “clean, well-educated technicians gazing at dials, instrument panels, or computer monitors” when we hear the word “technology”, rather than “men with soiled hands tinkering with machines at a workbench” (Marx 1997). Science understands nature through quantification and formalization as a complex of functional units subject to formal laws and thus, exposed to instrumental control through their transformation and recombination. The antique understanding of *technè* as an activity inferior and immanent to nature was undermined by the Christian idea that man was made in the image of a god which is exterior to nature and has created it according to its will. Later, in the 17th century, the difference between nature and technology was flattened by the idea that both were subject to mathematics which made human and divine knowledge commensurable (Bourg 2006). This evolution reinforced the vision that man is exterior and superior to a nature devoid of intrinsic ends (morally neutral) while only he can pursue ends and is thus invited to instrumentalize nature in their pursuit. The interconnection between science and technology has thus become much stronger in the modern world, paving the way to an unprecedented development of both. Not only did the scientific understanding of nature encouraged its instrumentalization, but new technical instruments enabled scientific discoveries (starting with Galileo's telescope) and scientific knowledge underpinned technological development. Crafts were essentially based on manual skills, trial-and-error methods, local and traditional knowledge, whereas modern technology is based on a systematic knowledge incorporated into technoscientific disciplines.

Discrete tools made and used by craftsmen had always been treated as neutral means requiring no particular explanation by a spontaneous ideology that we may call common sense instrumentalism. In the face of modern technology, this spontaneous understanding appeared increasingly problematic. The whole environment in which men started to live became man-made, rather than natural as it largely used to be in premodern societies. Technology could not be portrayed anymore as a tool holding in one's hand, it appeared as an englobing phenomenon in which men lived and which influenced their subjectivity and way of life. For thousands of years, man-made instruments were dwarfed by natural phenomena and men felt threatened by the hostility of nature and the limits of their technological power. Today, the threat essentially comes from the gigantism of our technological power, as mankind has developed means that have the potential to cause its own annihilation – either directly, through nuclear war, or indirectly, through the ecological consequences of economic development. As industrial factories emerged, workers did not so much appear as sovereign technical subjects instrumentalizing nature in the pursuit of their own ends, but more as technical objects exploited as instruments of production for the profit of others. They did not seem to control the productive process but to follow the rhythm and requirements of machines. Furthermore, until the advent of modern capitalism the role of markets “was no more than incidental to economic life” (Polanyi 1944, p. 45). Market exchange did not represent the centre of economic life and was strictly regulated by traditional institutions (e.g., medieval guilds) and rules. Such regulations thoroughly framed prices, quantity and quality of products, the organization of labour, its

intensity and duration, and the technologies allowed for use in production. The development of capitalist markets destroyed them altogether to leave a single imperative: to maximise production outputs while minimising inputs (fixed capital, labour, natural resources) in order to survive against competitors and maximise profits. Consequently, the organisation of production had to be rationalised based on technoscientific knowledge and with the constant introduction of new machines. In that context, the division of labour continuously expanded while the growing diversity of specialized activities got coordinated through markets and bureaucracies – thus giving to social domination an ever-more rational appearance. Finally, modern machines and technological systems came with the systematic need to extract, accumulate and distribute energy from natural sources (e.g., coal, oil). In premodern societies on the contrary, most energy came from human and animal motion; hydraulic or wind energy was sometimes also used, but never was accumulated. This distinction between modern machines deriving energy from nonhuman sources, as opposed to premodern tools driven by human energy (usually of the tool's individual user), has been central to many theories of technology (Heidegger 1954; Illich 1973; K. Marx 1857; Mitcham 2004).

Progress, determinism and substantivism

The progressive vision of history emerged under the influence of the Enlightenment and the philosophies of history it fostered in the late 18th century and “has dominated Western secular thought for some two and a half centuries” (L. Marx 1994). The modern understanding of history tends to dissolve the meaning and value of singular acts and events into the global process of a universal history of mankind (Arendt 1961). It is not that singular events are always seen as insignificant, but that their meaning depends on and will be revealed by the global process of history. Arendt insists that this concept of history radically distinguishes modernity from previous periods, in which each singular event contained and disclosed a share of general meaning. This universal process is organized on an arrow of time in which emancipation is associated with a radical rupture with an archaic and stagnant past anchored in a local culture, and the advent of a more enlightened and cosmopolitan future (Latour 2017). The political and industrial revolutions that occurred in the late 18th century were central to the constitution of this progressive understanding of history. The political categories of left and right emerged during the French revolution, as the most radical partisans of the rupture with the past sat on the left at the national assembly, opposing conservatives and reactionaries on the right. The industrial revolution gave birth to a mode of production based on unlimited capital accumulation and economic growth, which requires the expansion of markets and irresistibly tends to include the whole of mankind into a global economic system. The hope that Enlightenment philosophers had for the future was largely based on their trust in the virtually certain progress of scientific knowledge and technological mastery over nature. A past of superstition was to be left for a future of rational and objective knowledge. The progress of the practical arts was expected to bring a steady and cumulative improvement in the conditions of life.

However, Enlightenment philosophers such as Turgot and Condorcet, Paine and Priestley, Franklin and Jefferson, regarded “innovations in science and the mechanic arts [...] as necessary but insufficient means of achieving general progress” (L. Marx 1994). Science and the practical arts were essential means to achieve the goal of a much more general progress, that is, the construction of a “more just, peaceful, less hierarchical, republican society based on the consent of the governed” (ibid). Their understanding of technology was still based on common sense instrumentalism: technology is a neutral means to an independently defined end. Thus, only political and moral inquiry can address the ends for which technology is used. The Enlightenment idea of progress – in which the development of technical means would serve the goal of political liberation – slowly degraded in the course of the 19th century, according to Leo Marx, to take an increasingly technocratic form: the improvement of technology came to be taken as the basis and measure of the progress of society. The means became the end. This ideological transformation coincided with the emergence of the concept of “technology” and the development of large technological systems such as the railroad system or later, the electric and telegraph systems. A railroad system not only implied a large amount of material equipment (e.g., a network of tracks, trains, stations, bridges), but also a corporate organization, large investments in fixed capital, and many specially trained managers, engineers, conductors, telegraphers, and mechanics. It had nothing to do with a discrete tool or with craftsmanship and called for a wider, much more abstract concept which became “technology”. Technology

appeared as a massive phenomenon, a quasi-irresistible force guiding the transformation of society and which had to be accepted as a complete whole. A perfume of technological determinism started to permeate the spirit of the time. It first came as a cheerful praise of the transformative powers of technological progress. The technocratic claim that politics – which expresses irreconcilable values and interests – should be replaced by technical expertise represents a radicalised version of this trend. It has been coming back regularly in public discourse since the industrial revolution: from Saint-Simon to the neoliberal “end of ideology”, going through Veblen, Taylor and many others. Technological determinism later came in a technophobic and dystopian form asserting that technology is biased towards domination and that its increasingly autonomous agency is tantamount to the end of human freedom. Following Andrew Feenberg (2012), we shall call the technophobic version of techno-determinism “substantivism”.

How should we approach the concept of technology? Langdon Winner (1978, p. 11-12) distinguishes three main sorts of elements that are generally included in the concept of technology: first, the wide range of physical objects (e.g., tools, instruments, machines, gadgets, weapons) that is usually referred to as technological; second, the whole body of technical activities and knowledge (e.g., skills, methods, procedures, technical disciplines, routines) that people engage in to accomplish tasks; third, a variety of “technical (rational-productive) social arrangements” such as factories, bureaucracies, armies, research and development teams etc. These three categories roughly correspond to the three main types of definition of the concept identified by Val Dusek (Dusek 2006, p. 31-36): technology as hardware, technology as rules, and technology as a system. The first type of definition reduces technology to hardware, to physical artefacts. This option has the advantage to clarify the concept, to make it very tangible, but it excludes many elements that should be understood as technologies. More importantly, an object cannot be understood as technological unless a person or a group makes it serve a function: a deserted airplane in the rainforest will not function as a technology and could even become the object of a cult. More simply, a flintstone standing by itself is not a technology until someone uses it as a weapon or a tool of some sort. The second type of definition understands technology as rules rather than tools or software rather than hardware. Technology in this case means instrumental rationality: it is the systematic and rational search for the most efficient means to a given end. It may include any technical object, activities, or organization inasmuch as they are expressions of instrumental rationality. This type of definition easily slips into essentialist and determinist understandings of technology as an extra-social, universal and autonomous force impinging on social life from the alien realm of reason.

The third type of definition approaches technology as technological systems: a technological system (e.g., railroad, electricity, automotive, aeronautic) is a complex of hardware, social groups, technical activities and knowledge involved in a technology. Such technological systems can be taken as an object of sociological or historical analysis to shed light on the complex interactions between technical and social factors that shaped them (Gras 1997; Hughes 1987). Constructivist scholars of science and technology studies (STS) are wary of definitions of technology centred on instrumental rationality as they easily lead to search for an extra-social essence of “Technology”. Some purposively avoid giving any general definition of technology and prefer focusing on specific technologies or technical mediations. Bruno Latour

straightforwardly declares that “technical is a good adjective” while “technique [or technology is] a lousy noun” (Latour 1999, p. 190). They thus study the historical construction and evolution of specific technical artefacts or systems. My approach is essentially based on Andrew Feenberg’s critical constructivism which integrates elements of the Frankfurt school tradition of critical theory with features of constructivist STS. Critical constructivism understands technology as “an elaborate complex of related activities that crystallizes around tool -making and -using in every society” (Feenberg 1992) and is informed by an instrumental rationality that can only be understood as impure, non-essentialist and always socially situated – a sociotechnical rationality.

How exactly should we understand the notion of technological determinism? Langdon Winner defines technological determinism as “the idea that technology develops as the sole result of an internal dynamic, and then, unmediated by any other social influence, molds society to fit its patterns” (1980). The slogan of the 1933 Chicago World’s Fair perfectly illustrates this idea and the influence it has had on western culture: “Science discovers, genius invents, industry applies, and man adapts himself to, or is molded by, new things...”. Technology would have an autonomous functional logic. It would resemble science and mathematics by its intrinsic independence from the social world, yet, unlike them, have major social impacts. Technological determinism thus contains two propositions (Feenberg 1992): unilinear progress and determination by the base. According to the first, technological progress follows a unilinear course, a fixed track, from less to more advanced configurations. Societies can advance slowly or quickly but they cannot choose the direction and definition of technological progress, there are no branches off the main line. The second affirms that society adapts to the imperatives of the technological base. Technologies come with functional constraints and a wide range of social effects. Factories and industrial machinery for instance, are often said to require social hierarchies. Friedrich Engels supported this thesis as he argued, against anarchists, that “authority” was a technical necessity of the industrial world: “The automatic machinery of the big factory is much more despotic than the small capitalists who employ workers ever have been. [...] Wanting to abolish authority in large-scale industry is tantamount to wanting to abolish industry itself, to destroy the power loom in order to return to the spinning wheel” (Engels 1872). These two propositions seem quite clear and easy to identify, which suggests that any theory can be strictly defined as techno-determinist or not based on these criteria. However, things are rarely that neat when we get to the task. Countless sophisticated theories have been written about technology, and although many revolve around this thesis, they take several forms and tend to resist any simple categorization. Many statements with techno-determinist tones are also common in public discourse – “the automobile created suburbia”, “the atomic bomb divested Congress of its power to declare war” (Marx et Smith 1994) – but they rarely come with general claims about the evolution of societies. Therefore, it seems more adequate to understand technological determinism as an idea that comes in various forms which we can describe as stronger or softer.

To the contrary, Bruce Bimber (1990) proposes a very precise and restrictive definition of technological determinism which does not convince me. He distinguishes three types of approach to technology that are often regarded as techno-deterministic: unintended consequences accounts, norms-based accounts and logical sequence accounts. According to

Bimber, the first two approaches are abusively called techno-determinist, while only the third really deserves the label. Unintended consequences accounts claim that, since new technologies often generate unintended social consequences which are inherently unpredictable and uncontrollable, then technology must be regarded at least as partially autonomous and responsible for determining certain social outcomes. I do agree with Bimber that such an approach cannot be described as techno-determinist. The fact that an outcome cannot be predicted or controlled does not imply that it is determined by an autonomous, extra-social force. Many human activities have unpredictable and uncontrollable outcomes. For instance, Hannah Arendt considers unpredictability to be an essential characteristic of political action: since all men have the capacity to act, our action can trigger many unforeseeable reactions (Arendt 1958a). The work of the craftsman on the contrary is much more stable and predictable as it is produced by a single will, controlling every parameter and bending materials according to its vision, so as to realise a concrete object. Therefore, we can agree with Arendt that the unintended consequences which increasingly accompany modern technological development do not mean that the latter is becoming autonomous. Rather, it means that *technè* (which Arendt refers to as ‘work’) was brought closer to political action (*praxis*) and its capacity to trigger unpredictable processes as it turned into modern technology.

Norms-based accounts of technology are exemplified by Jurgen Habermas, who does not consider himself a techno-determinist but has sometimes been designated as such. From this perspective, technological determinism is above all a cultural phenomenon and the essential question is: “Has society adopted a hegemonic cultural mind-set which limits discourse and judgement to matters of logic, reason, or productivity?” (Bimber 1990). Technology could be considered autonomous and deterministic when the norms by which it is advanced are removed from political and ethical discourse, when value-based debates over alternatives and methods are replaced by goals of efficiency and productivity. According to Bimber, norms-based accounts should not be labelled techno-determinist. He argues that technological determinism should logically be both deterministic – it should hold that history is determined by laws or physical and biological conditions rather than human will – and technological – it should rely upon features of technology to explain those determining conditions or laws. The notion of technology should be restricted to hardware, material artefacts and exclude technical knowledge, processes, and organisations since these are important features of societies themselves. Their inclusion would lead to conflate the dependent and the independent variables: social change would be explained by factors that are partly social and intellectual. In regard of these criteria, norms-based accounts are not techno-deterministic as they do not attribute causal agency to the characteristics of technology as artefacts, but to human social practices and cultural beliefs.

Only the logical sequence accounts manage to meet the high standards of this definition of technological determinism. Logical sequence accounts hold that social change proceeds strictly in accordance with technological change which follows a unique and naturally given path, determined by physical laws that are sequentially discovered by people and inexorably applied to produce technology. Cultural and social change then follows from technology and so, the organisational dimensions of technological systems like the railroad, come as necessary consequences of the artefact itself.

At first sight, Bruce Bimber's definition of techno-determinism appears convincing and close to the one we have adopted. Norms-based accounts seem clearly different from logical-sequence accounts and the latter seems to perfectly fit our definition of techno-determinism. A doubt may emerge though, when we see that Bimber puts Jacques Ellul in the category of norms-based accounts and proposes as his unique example of a logical sequence account Robert Heilbroner. As we will see later in this chapter, Ellul's social theory supports the three different accounts: it insists that technological development has multiple unpredictable and uncontrollable consequences, that it is associated with the replacement of ethical and political norms by norms of efficiency, and that it has become a determinant factor of social change that follows a universally given and necessary path. The techno-determinism of Robert Heilbroner (1967; 1994) is much softer than this.

Firstly, Heilbroner (1967) asserts that "technological progress is itself a social activity": the very activity of invention and innovation is an attribute of some societies and not others, the tribesmen of New Guinea for instance, have persisted in a Neolithic technology until our day. Secondly, if "the general level of technology may follow an independently determined sequential path [...] its areas of application certainly reflect social influences". Thirdly, "the course of technological change must be compatible with existing social conditions": for example, labour-saving machines will not be adopted in societies where labour is abundant and cheap. Fourthly, the level of technology has large implications on a society's class structure and relations of production, but it is unclear to what extent it influences other sociological features (e.g., arts, gender relations). Fifthly, the relations of production are dependent on the level of technology but the opposite is also true: "It was not only the steam-mill that gave us the industrial capitalist but the rising inventor-manufacturer who gave us the steam-mill" (Heilbroner 1967). Indeed, the emergence of a market system organized around private property led to systematically guide the technological capabilities of societies to the problem of production. Overall, for Heilbroner, technological determinism is "a problem of a certain historical epoch specifically that of high capitalism and low socialism in which the forces of technical change have been unleashed, but when the agencies for the control or guidance of technology are still rudimentary". It is only in the context of capitalism and of "a socialism based on maximizing production and minimizing costs" that technology took on an "automatic" aspect, started to appear as an impersonal force bearing on socioeconomic life, and this was reinforced by a *laissez-faire* ideology restraining political intervention. In short, Heilbroner's theory, though it is the unique example of technological determinism given by Bimber, mostly fit the category of norms-based approaches to technology.

I do not think that the problem here is simply that Bimber misinterprets Ellul and Heilbroner. Rather, I believe this misinterpretation reveals a deeper problem with his definition of technological determinism and his distinction between norms-based accounts and logical sequence accounts. In my opinion, the root of the problem lies in Bimber's definition of technology as hardware, physical artefacts. He limits technology to hardware so as to make techno-determinism appear as a perfectly neat and consistent thesis, in which the independent variable (material artefacts) determines the dependent variable (social structures). But the simple fact that technical artefacts cannot progress from lower to more developed levels without the methodical application of technical knowledge, implies that a concept of instrumental

rationality must intervene at some point. Instrumental rationality is an intellectual phenomenon and it is not as hegemonic in all societies: logical sequence accounts thus logically tend to collapse into norms-based ones. While Bimber fails to give any convincing example of an author reaching the standards of his definition of technological determinism, it appears clearly that authors such as Ellul or Heidegger – who are usually considered to be the most radical proponents of techno-determinism – understand technology as instrumental rationality. I do not want to argue that all proponents of norms-based accounts are techno-determinists – I would not call Habermas a techno-determinist. Rather, my argument is that Bimber’s rigid distinction between an intellectual/cultural (norms-based) and a supposedly material (logical sequence) approach to technology, obscures the fact that technological development necessarily has an intellectual dimension anchored in a form of instrumental rationality. Consequently, what really matters is the actual structure of this rationality.

First, can rationalisation progress along different paths or only one? Is technological progress forced to follow a unilinear track? Second, is there anything like an essence of instrumental rationality that can be grasped independently from particular and socio-historically situated instrumental practices? These two problems are very close but not exactly similar. Essentialist conceptions of instrumental rationality generally lead their proponents to view technological progress as unilinear. However, this is not always the case. Andrew Feenberg noted for instance that Jurgen Habermas simultaneously promotes an essentialist conception of technology and rejects the thesis of unilinear progress:

“Habermas would of course agree that technological development is influenced by social demands, but that is quite different from the notion that there are a variety of technical rationalities, as Marcuse believes. For example, Habermas is in favour of ecologically sound technology, but in his view technology as such remains essentially unchanged by this or any other particular realization. Technology, in short, will always be a non-social, objectivating relation to nature, oriented toward success and control. Marcuse argues, on the contrary, that the very essence of technology is at stake in ecological reform” (Feenberg 1999, p. 156-157).

Jurgen Habermas (as well as Heidegger) adopts the Weberian vision of modernity as a process of differentiation between social domains and types of action (e.g., technical, aesthetic, ethical) which were unified in premodern societies. In his early works, Habermas identified technical action with technology, but he later enlarged it to economic and administrative forms of success-oriented actions which then caught most of his attention. All these forms of technical action would pertain to a general type of rationality (instrumental rationality), characterized by an eternal essence that the modern process of differentiation has simply revealed in a purer light. This essentialist concept of instrumental rationality does not sufficiently discriminate between different realizations of technical principles, between culturally distinct achievements in the “cognitive-instrumental sphere”. Although Habermas rejects the idea of unilinear progress, he is thus led to underestimate the potential scope of technological reform. In his view, instrumental rationality remains neutral in its own sphere and its political implications only arise when it expands to other domains. The fundamental political objective then, is to

keep an essentially unchanged instrumental rationality within the boundaries of the sphere it legitimately rules.

Now that we have reached a more satisfactory understanding of the concept of technological determinism – as an idea which contains two propositions (unilinear progress and determination by the base) and comes in various forms that can be described as stronger or softer – I propose to analyse in the next section the works of two theorists who have been labelled techno-determinists: Karl Marx and Jacques Ellul. This exploration will allow us to better understand the diversity of techno-determinism and to question the extent to which these authors fit in this category. More importantly, it will later help us to grasp (in chapter 3) how some theories of the common(s) have inherited or taken their distance from techno-determinist ideas.

Determinism

Karl Marx and Technological Determinism

Was Karl Marx a technological determinist? Needless to say, Marx has been interpreted and re-interpreted in countless directions during the century and a half which separates us from him. A great number of authors consider Marx as a techno-determinist (e.g., Robert Heilbroner, Cornelius Castoriadis, Langdon Winner, Lewis Mumford), while many others reject this view (e.g., Bruce Bimber, Donald MacKenzie, Raniero Panzieri, Daniel Bensaid). As Bimber rightly notes, the ambiguity of what is meant by “technological determinism” lies behind much of the debate, so that participants may sometimes (unknowingly) be arguing more about what is technological determinism than about what is Marxism. For a long time, the interpretation of Marx as a technological or economic determinist was widely accepted by Marxists as well as non-Marxists, but it got increasingly attacked from the 1950’s onwards. Such critiques came mostly from critical and minoritarian Marxist currents. In those years, the techno-determinist tone of the dominant/orthodox Marxist discourse posed serious problems to large portions of the revolutionary left, which felt the need to propose an alternative interpretation/revision of Marxism (e.g., Panzieri and Italian Operaismo, early Frankfurt School theorists) or to reject Marxism as a whole (e.g., Cornelius Castoriadis). I agree (with minor qualifications) with Castoriadis’ critical interpretation and rejection of Marxism as a form of techno-economic determinism.

According to Castoriadis, there are two opposed elements in Marx’s writings and in the history of Marxism: a revolutionary element and a systemic-deterministic element. The revolutionary element is present in the early works of Marx, sometimes also in his late writings, and it resurfaces occasionally in the works of important Marxist theorists (e.g., Luxemburg, Lenin, Trotsky, and Lukács). It is expressed in the call to transform the world rather than only interpret it, to surpass philosophy by realising it in the world, in the insistence that men make their own history though in given conditions, in the declaration that the emancipation of workers will be conquered by workers themselves, or in the glorification of the utterly creative power of masses during the Paris Commune. This element sets the goal of a revolutionary self-transformation of society through a praxis taking place in and building upon concrete conditions. However, this element remained at the stage of intuitions, punctual eruptions, and rapidly got stifled by a deterministic and systemic theory of history.

What does this theory of history consist in? A famous passage of Marx’s preface to “A Contribution to the Critique of Political Economy” (1859) is often proposed as its most characteristic or caricatural presentation. We may note that Marx introduced it as: “The general conclusion at which I arrived and which, once reached, became the guiding principle of my studies”.

“In the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production. The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to

which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness. At a certain stage of development, the material productive forces of society come into conflict with the existing relations of production or – this merely expresses the same thing in legal terms – with the property relations within the framework of which they have operated hitherto. From forms of development of the productive forces these relations turn into their fetters. Then begins an era of social revolution. The changes in the economic foundation lead sooner or later to the transformation of the whole immense superstructure.”

First, Marx distinguishes an economic structure of society (representing its “real foundation”) from a “legal and political superstructure” with associated forms of social consciousness. The economic base is determinant while the superstructure and intellectual life merely represent distorted reflections of this tangible reality. Second, within the economic base, the true engine of historical evolution is the development of productive forces. According to Castoriadis, this means that the development of productive forces (which he equates with the unilinear progress of technology) immediately determines relations of production and the economic structure of society, and mediately determines the whole social superstructure. Another famous phrase of Marx comforts that interpretation: “The hand-mill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist” (Marx 1847). Therefore, Castoriadis considers that Marx conceives history as determined by the autonomous development of technology. Castoriadis usually speaks of economic determinism to refer to Marxism but does not strictly differentiate this notion from technological determinism. Indeed, the determinant role played by technology only applies inasmuch as technology shapes production. Military or artistic technologies do not matter here.

Castoriadis rejects the Marxist theory of history for the following reasons:

- It holds that the engine of history is, “in the final analysis”, the autonomous development of technology, while Castoriadis considers technology to be neither determinant nor autonomous.
- It submits all of history to categories which are only suited for developed capitalist societies.
- It is based on the hidden postulate of a human nature which is essentially fixed and whose dominant motivation is economic.

Technology here does not only refer to machines but also to rational-productive social arrangements, to relations of production. Relations of production, the mode of collaboration between producers represent a productive force. However, productive forces do not simply consist in relations of production – they also include physical means of production and human knowledge/abilities – which explains why they are eventually meant to contradict them and push towards a revolutionary transformation. Castoriadis refuses to attribute a determinant role to technology: “it is one thing to say that a technology, an organisation of labour, a type of relation of production are associated with a form of life and a general social organisation; it is another to speak of the determination of the latter by the former” (Castoriadis 1980). It is

impossible to see a proper determination of a variable by another in this situation, as the two variables cannot be separated. Leo Marx (1997) forcefully illustrates this point using the example of the automotive technology and its supposed “impacts”. The automotive technology is deeply entrenched in society and its boundaries are unclear: apart from particular cars, does it include factories, engineers and their disciplines, corporate structures, the road-building and maintenance systems, the oil and steel industry etc...? Consequently, “to speak, as people often do, of the ‘impact’ of a major technology like the automobile upon society makes little more sense, by now, than to speak of the impact of the bone structure on the human body” (Marx 1997).

Castoriadis also advances multiple arguments against the idea of an autonomous technological development. About 99.5% of human history occurred on the base of what appears to us as a form of technological stagnation: civilisations and empires developed and collapsed based on rather similar technological infrastructures. Ancient Greeks developed technologies that were largely inferior to what their scientific knowledge made possible, which can be explained by their general attitude towards nature and labour. The modern association of science and technology oriented towards the unrestrained exploitation of nature comes from a new imaginary, whose emergence is inseparable from the one of the bourgeoisie. Only with the advent of capitalism does technology take on a seemingly automatic development and this is only an appearance. The selection of technologies of production is an object of class struggle and technological research is largely oriented towards the aims of dominant classes. Intellectual and social life do not merely reflect the techno-economic base but are historical agents in their own rights and probably the most decisive ones: “the Sermon on the Mount and the Communist Manifesto belong to historical practice just as much as a technical invention and, with regard to their real effects on history, carry infinitely greater weight” (Castoriadis 1975, p. 31). Anticipating possible accusations of “idealism” coming from contemporary Marxists, Castoriadis answered that the most naïve and crude form of idealism is that which reduces all human history to the necessary consequence of a single factor abstracted from the rest, and which even turns out to be ideological. Indeed, for Marxism the engine of history is a specific set of ideas: not philosophical, political nor religious ideas, but technical ones, which mysteriously evolve autonomously until they invest material structures.

Castoriadis contends that the Marxist theory of history is also problematic as it submits all history to categories that only exist as such in capitalist societies. The affirmation that the development of productive forces has determined other social structures throughout all history, supposes that all societies had the same articulation between different social spheres such as technology, economy, law, politics, religion, etc. Yet, this articulation is particular to modern capitalist societies. There is no universal and eternal articulation between the different domains of social life. History always alters and redeploys the different spheres of social life in new ways. It cannot be said in general that “economy determines ideology” or the opposite, since the existence of economy and ideology as (incompletely) separate spheres which may influence one another is a product of history: “In short, there are not in history, even less than there are in nature or in life, separate and fixed substances that act on one another from outside” (Castoriadis 1975, p. 36). That point sharply contrasts Castoriadis’ perspective with the

essentialist conception of technology proposed by Habermas or Heidegger: technology does not have a fixed essence revealed by the modern process of differentiation of social domains.

Furthermore, the claim that the development of productive forces is the engine of history implicitly relies on the assumption of a universally fixed human motivation. Throughout history, men would always have been striving (consciously or not) to increase the level of production and consumption. To the contrary, Castoriadis affirms that human desires and needs are socio-historical creations and that only few societies direct them towards the maximisation of production by rational means. The idea that all societies were driven towards the objective of production growth and were only limited by the level of their technology, abusively projects on all human history the motivations and values dominating modern capitalist societies.

“Thus when, as in the cultivation of maize by certain Indian tribes in Mexico, or in the cultivation of rice in Indonesian villages, agricultural labour is lived not only as a means of providing food but at the same time as the cult of a god, as a festival and as a dance, and a western theorist appears on the scene and interprets all in those gestures that is not specifically productive as no more than mystification, illusion and cunning of reason, it must be forcefully asserted that this theorist is a much more radical incarnation of capitalism than any boss will ever be. For not only does he remain a lamentable prisoner of the categories specific to capitalism, but he wants to submit all the rest of human history to them, claiming broadly that all that people have done or sought to do for thousands of years is but an imperfect sketch of the factory system.”
(Castoriadis 1975, p. 41)

Despite his repeated affirmation that human needs are historical products, Marx never drew out the implications of this claim as he reduced these needs to economic ones. History then appears as a progress into rationality, understood by reference to two fixed points: on one side, a nature that can be scientifically daunted and mastered, on the other, the economic needs of humans that set the universal goal of the technological enterprise. Technology and its advance would serve permanent features of our biological constitution and represent the advance of the human species in general. In his mature works, Marx is much less concerned with what is produced and how it is produced (the means and organisation of production) than with the distribution of value and the capitalist appropriation and use of machines and technologies that are considered neutral. In *Capital* Vol. 1, for instance, Marx criticizes the strategy of machine destruction followed by the Luddite movement: “It took both time and experience before the workpeople learnt to distinguish between machinery and its employment by capital, and to direct their attacks, not against the material instruments of production, but against the mode in which they are used” (Marx 1867a, p. 288). Paradoxically, the most techno-determinist aspects of Marxism slip back into a form of instrumentalism.

As it is well known, historical materialism articulates this techno-economic determinism with class struggles: history is not reduced to the peaceful advent of a universal rationality since violent conflicts between social classes with antagonistic interests stemming from their different positions within relations of production play a major role. Still, Castoriadis contends that in historical materialism, the role of class struggles is completely subordinated to the deterministic element. Class struggles, he argues, do not represent a separate and creative factor

which can autonomously deviate the direction of history, but only “a link in the causal connections established unambiguously at any given moment by the state of the technical-economic infrastructure” (Castoriadis 1975, p. 43). The action of social classes, the orientation of their struggles, is each time necessarily given by their situation in the relations of production on which they have no say: “In fact, the classes are simply the instrument in which the action of the productive forces is embodied” (1975, p. 44). Marxism conceives history as a natural object that can be theorized using models of natural sciences. Engels made multiple parallels between historical materialism and Darwin’s theory of evolution for instance, while Marx described as “excellent” the following description of his method by a commentator: “Marx considers social evolution as a natural process ruled by laws that are independent of human will, consciousness or intentions, but on the contrary determine them”⁹. History is governed by causal laws that can be seized by our reason: every event occurs as a result of a combination of causes and all the connections between causes and effects form a consistent and complete system. Historical reality is one single and global process governed by necessity, which must lead to a world of liberty, realising in that the aspirations of humanity and revealing the general meaning of history. However, the idea that the advent of communism is inevitable comes with the one that history may “fail” and reveal itself absurd: the struggle between antagonistic classes could lead to their mutual destruction, so that there is alternative between two outcomes, socialism or barbarism. In the hypothesis that the second term prevails, then not only Marxism but all theories would collapse while history would be rendered meaningless.

One of the major problems coming with this approach to history is its technocratic implications¹⁰ (debate B): “if there is a true theory of history, if there is a rationality at work in things, it is clear that the direction this development takes should be left to the specialists of this theory, to the technicians of this rationality” (Castoriadis 1975, p. 87). If the theory is true, it defines the path of history and the autonomous actions of masses are valuable only insofar as they conform to it; if they do not, they are objectively reactionary. If, on the contrary, the political action of masses is a creative historical factor in its own right, then the theory cannot be an absolute criterion giving the ability to judge history from above, it can only enter history and eventually be shaken and surpassed by its developments. Consequently, Castoriadis concludes that the “theoretical origin of the decay of Marxism” – which is the “ideological equivalent of the bureaucratic degeneration of the worker’s movement” – should be searched in its transformation into “a theoretical system which is complete and finished in its intention, in the return to the contemplative and the speculative as the dominant mode for solving the problems posed to humanity” (Castoriadis 1975, p. 101).

In the decades that followed the end of World War II and especially in the 1960s, around the world, a generation of intellectuals representing what became known as the New Left, broke with most of these techno-determinist (A), technocratic (B) and technophile (C) traits of

⁹ Quoted in Castoriadis 1975, p. 84. This quotation of “Le Messager Européen” of Saint-Petersburg is commented by Marx in *Capital* Vol. 1, p. 556, Edition de La Pléiade.

¹⁰ This technocratic perspective corresponds to what Arendt calls the “Traditional substitution of making for acting”. That is, the substitution of work (*poiesis/technè*) for action (*praxis*), a phenomenon of which she finds the origin in Plato. Hannah Arendt, *The Human Condition*, 1958, p. 220.

Marxism. To cite only three names among many, we can find clear similarities on that issue between Cornelius Castoriadis (France), Raniero Panzieri (Italy), and Herbert Marcuse (Germany and the US). Two major contextual factors can help to understand why this generation of thinkers came to attack these aspects of Marxism – either to reject Marxism as a whole (Castoriadis) or to propose a revision/reinterpretation of it (Panzieri and Marcuse). First, the economic context in the West between 1945 and 1975 appeared in clear contradiction with Marx’s forecast. Marx expected capitalist relations of production to become fetters to the development of productive forces and capitalism to collapse under the weight of its own contradictions: the profit rate would progressively fall, poverty (absolute or relative depending on interpretations) would rise, unemployment would grow as machines displace workers, competition would concentrate industrial capital in a few hands, turn petty bourgeois into proletarians, “socialise” production in large organisations contradicting the anarchy of the market which rules the sphere of distribution, and increasingly violent crises of over-production would eventually trigger a social revolution. On the contrary, the decades following World War II were characterized by an unprecedented economic growth, full employment, the rise of consumerism, and the reduction of absolute poverty as well as inequalities. Capitalism appeared here to stay.

According to Castoriadis, this meant that Marx had overestimated the reification of men under capitalism: its ability to reduce men into things subjected to objective economic laws, to “tendencies working with iron necessity towards inevitable results” (Marx 1867a). Even under capitalism, the economy does not completely function as an autonomous system governed by laws functioning independently from society and its unpredictability. Marx did not anticipate that the actions of men would affect the economy and stabilise capitalism: the dominant classes organised to counter the spontaneous tendencies of the economic system while workers’ struggles favoured redistribution, thus enabling the rise of consumption which absorbed the growth of production. Considering the profound evolution of the economic situation since the 1970s (e.g., economic stagnation, rising inequalities, poverty and unemployment, economic crises, an arguable fall of the profit rate), one may ask whether the contradictions of capitalism highlighted by Marx still apply while the social dynamics observed by Castoriadis would only represent a delay in their realisation. Different authors support some version of this thesis today, including non-Marxists (e.g., Jeremy Rifkin).

Overall, in the context of a thriving capitalist economy, authors of the New Left were led to re-evaluate the subjective and ideological factors of historical change as opposed to objective, materialist, techno-determinist ones. The socialist revolution was not seen as an historical necessity anymore but had to be actively provoked: “There is no occult, ‘objective’ factor, which, hidden in the development of technology or in the plan of the current capitalist society, guarantees an ‘automatic’ transformation or ‘necessary’ overthrow of existing social relations” (Panzieri 1961). For the three thinkers above-mentioned, technological development was not following a unilinear, objective and necessary path but was shaped by capital: “In its use of machines, capitalism determines technological development itself, it does not only represent a deviation in a movement that is ‘objective’ and rational in itself” (Panzieri 1961). The ability of capital to shape technology was seen as a reason of its stabilisation and reinforcement: capital would not be overthrown by the development of productive forces since it shaped their structure

to perpetuate its domination. All three thinkers also called for the creation of a radically new and emancipatory technological rationality, through an antibureaucratic and antitechnocratic socialist revolution, aiming for workers' self-management of production. Their critiques were not aiming to change any particular technological design, rather, it was directed to the epochal structure of technological rationality, which could only be challenged through revolutionary change.

The second contextual factor that encouraged thinkers of the New Left to criticize the deterministic element of Marxism, was that it had become the official ideology of the Soviet bureaucracy. The bureaucratic control of industrial production in the Soviet Union, the intense exploitation of the proletariat through the adoption of capitalist managerial methods (e.g., Taylorism), were presented as technical necessities (echoing Engels' previously cited text), as the only possible path of rationalisation and industrialisation. They were presented as politically neutral and objectively necessary: attempting to resist to them would thus be a mark of irrationality, illusory romanticism or reactionary tendencies. Developing production through the most efficient methods would progressively drive humanity towards a state of abundance enabling the dissolution of the state and social classes. As Castoriadis puts it: "It has often been asked how Marxists could have been Stalinists. But if the capitalist bosses are progressive, on the condition that they build factories, how could the commissars who build just as many and even more of them not be so as well?" (1975, p. 86).

Was Karl Marx really the techno-determinist thinker portrayed by Castoriadis? Again, this deterministic interpretation of Marx – orthodox Marxism – clearly dominated the Second, Third, and even the Fourth International (founded by Trotsky). The arguments proposed in the late 19th/early 20th century by Luxemburg, Kautsky and Lenin in their unanimous condemnation of Bernstein's revisionism is very instructive in that respect. Bernstein argued that capitalism got stabilised, that crises were disappearing, middle classes were expanding and the living conditions of workers improving, so that it was illusory to wait for a revolutionary transformation provoked by capitalism's brutal collapse, and that socialists should instead strive to gradually improve workers' lives and control over production through trade unionism and cooperatives. In reaction, Rosa Luxemburg asserted that "according to scientific socialism, the historic necessity of the socialist revolution manifests itself above all in the growing anarchy of capitalism, which drives the system into an impasse" and "if one admits with Bernstein that capitalist development does not move in the direction of its own ruin, then socialism ceases to be objectively necessary" (Luxemburg 1900). If socialism ceases to be an objective necessity, if "it is no longer the result of the material development of society", then "the socialist transformation of society is only a utopia". To her, socialism necessarily requires a revolution and this revolution cannot happen if it is not objectively necessary. She thus attempts to demonstrate that the advent of socialism is objectively necessary.

As the determinist aspect of orthodox Marxism became increasingly problematic for socialists throughout the 20th century, many authors have attempted to exonerate Marx from it and reduce it to a specific interpretation of his writings. One way of doing that was by attributing all outdated deterministic aspects of orthodox Marxism to Engels and his influence over the Second International (Levine 1973). Another one has been to argue that the deterministic

element of Marx is mostly found in his previously cited Preface of 1859, which would have been purposely written in a rather abstract and apolitical style to avoid Prussian censorship, while the base-superstructure metaphor is rarely reproduced in his later texts (Prinz 1969). In my opinion, Castoriadis is right to argue that there are two conflicting elements in Marx: the deterministic element is present, although he may slightly overestimate its dominance. Capital Vol. 1 is unquestionably filled with references to the notion of historical necessity (Marx 1867b): “the capitalist mode of production presents itself as a historical necessity to transform isolated labour into social labour” (p. 422), “[division of labour in its capitalist form] thus presents itself as a historical progress, a necessary phase in the economic formation of society, and as a civilised and sophisticated means of exploitation” (p. 456), “the inevitable conquest of the political power by the working class” (p. 540), etc. Feenberg advances powerful arguments to support that “Marx was not a technological determinist” (2017, p. 30). He argues that, for Marx, technological progress does not follow a unilinear track, that rationalisation in modern societies is potentially dual, either capitalist or socialist, based on the following phrases of Marx: “[machinery] is the most powerful weapon for repressing strikes, those periodical revolts of the working class against the autocracy of capital. [...] It would be possible to write quite a history of the inventions, made since 1830, for the sole purpose of supplying capital with weapons against the revolts of the working-class” (1867a, p. 291). This interpretation seems consistent with many passages of the chapters “Division of labour and manufacture” and “Machinery and modern industry” of Capital Vol. 1, in which Marx insists on the way capitalist interests shape the organisation of labour in the factory: the distinction between efficient machines and organisational methods (rational means) and capitalist interests (ends) is not always perfectly neat. However, since Marx simultaneously affirms that the emergence of capitalism and its replacement by communism are historical necessities, the deterministic interpretation of history as teleologically oriented towards communism still prevails. Capitalist interests might have a minor influence on the orientation of technological development, but this happens during a limited and necessary historical phase and such influence have no historical weight. What matters during the capitalist phase is not the minor influences of capital over the direction of technological progress, but its major contribution to technological progress (essentially productivity) as such, which should inevitably lead to communism.

My aim here is not to claim that Marx can only be read and rejected as a strong techno-deterministic author. Other interesting readings exist and, in any case, what matters today is not so much what Marx really had in mind than how we can learn from his most lucid insights to think and act in the present¹¹. My intent was instead to identify and analyse the techno-deterministic element in Marx’s writings and in orthodox Marxism, as I believe it both reflects and has immensely contributed to shape the modern political imagination. In respect to my

¹¹ As Jacques Ellul puts it:

« But how could we forget that socialism used to draw its strength from... the weight of things, from historical Necessity. How couldn't we look back at the last century: communism would necessarily arise since it, and only it, was in the sense of History. [...] The future would necessarily have to belong to us. It was by no means the product of men's will and conscious decisions. And all this is indeed in Marx. As well as the opposite. And today then, we prefer the opposite. We prefer to say that man makes his history. What a strange and attention-worthy turnaround.”

Jacques Ellul. *Changer de révolution: L'inéluctable prolétariat*, 1982.

research aim, what matters even more is that this deterministic element in Marx and Marxism has profoundly influenced current theories of the common(s) (especially theories of the common(s) as a mode of production).

Jacques Ellul and Technological Determinism

Jacques Ellul's works on technology fit in Andrew Feenberg's category of substantivism (in which we also find Martin Heidegger, Marshall McLuhan, and to some extent Max Weber). Substantivism not only claims that technology has an extra-social essence, develops autonomously and largely determines society, but also that it is biased towards domination. While orthodox Marxism affirms that technological progress will free humanity, Ellul sees in it a loss of freedom and a source of social hierarchy and control; in other terms, the first is technophile and the second technophobic. Ellul's theory can be interpreted as both less and more techno-determinist than orthodox Marxism. Less since Ellul never claims to have discovered the universal laws governing human societies from their origins nor to be able to predict their future: "I am by no means saying that technology has always and in all societies, been the determining factor (this is the kind of generalization that I rebuke in Marx)" (Ellul 1977, p. 67). Technology has only adopted an autonomous character and become the determining factor of social evolution in western modernity and especially since the 1950's. Ellul can appear more techno-deterministic than Marx however in that he strongly rejects instrumentalism: for him the ends are largely implied by the means, which is why a socialist revolution cannot simply seize the industrial means of production (nor the state) and use them to emancipate the working class. Capitalism and the proletarian condition result from industrial machinery, not from a specific social context. Symmetrically, the industrialisation of communist regimes led to the development of a proletariat exploited by an alternative form of capitalism (state capitalism). Behind substantivism often lies the historical experience of the disillusion triggered by the bureaucratisation of Soviet Russia: if the revolution could not democratize the industry, then the root of alienation might lie in an unescapable technological rationality. What Weber called the "iron cage" of bureaucracy is then required by rationalisation, the only alternative is between rational hierarchy and irrational protest. Ellul can also appear more techno-deterministic than Marx since he does not focus only on technologies of production and their influence over the economy, but on technology in a much wider sense, which he argues, exerts a strong influence on all spheres of modern societies (e.g., economy, administrations, mores, art, sex, sport).

What is technology ("*La Technique*" in French) according to Jacques Ellul? In his view, the modern technical phenomenon cannot be understood by only focusing on particular technologies. If technologies used to be indeed separate and discrete tools controlled by individual users – means used for a particular end – it is not the case anymore since technology has taken the form of a system. We are not facing scattered and limited technologies which are included in specific social contexts. Instead, we as individuals are now included in a technological system which functions according to its own laws and that is the essential root of modern alienation. Technology has largely replaced nature as our living environment and now influences our subjectivity – what we desire depends upon what we are technically capable of doing. To go beyond the reassuring illusion of scattered technologies and grasp the essence of the system, Ellul invites us to adopt his concept of technology which amounts to instrumental rationality: technology is "the ensemble of the absolutely most efficient means at a given moment", so that "wherever there is research and application of new means based on the criterion of efficiency, one can say that there is technology" (1977, p. 26). The important point

in this definition is that there is at every given moment only one technical means that objectively imposes itself as the most efficient and hence is always adopted – technical progress thus follows a unilinear track. What does it mean to say that technology is a system? Ellul's definition of a system draws upon Talcott Parsons':

- A system is a set of elements interrelating in such a way that any evolution of one triggers a revolution of the whole, and any modification of the whole has repercussions on each element.
- The elements composing a system have a sort of preferential disposition to combine among themselves rather than with outside factors.
- A system is dynamic, composed of sub-systems and able to re-organize itself thanks to its feedback structures.
- A system exists as a totality that can enter in relation with other totalities, other systems.

Computers facilitated the constitution of technology into a system: information connects the diverse elements of the system by putting in relation “everything that is performed and everything that could be performed in the neighbouring operational areas” (Ellul 1977, p. 92). However, the feedback structures of the technological system are imperfect as they only permit its re-organization based on information about itself and not information about the outside – though it is outside that the system causes problems. The technological system is autonomous from the state and politics, as well as from the economy and ethics. In supporting technological development, the state becomes a technical agent itself, integrated in and shaped by the technological system. Politicians take decisions on matters they barely understand based on the advises of technicians who are themselves specialists completely unable to grasp the system as a whole. The economy cannot influence the direction of technological development but only facilitate or hinder its advance. And technology is autonomous from ethics in that it is purely driven by a logic of efficiency while technicians cannot bear any moral judgment about their work. In addition, technological development is “neither bad, nor good, nor neutral, but is made up of a complex mix of positive and negative elements” (Ellul 1988, p. 93). The problem is that we cannot choose to have only the good aspects of technology, we cannot “use” technology for a good purpose as if it was a simple tool. The system develops and we must live with its ambivalent consequences. And as it progresses, the complex imbrication of positive and negative aspects as well as the strength of their agency gets reinforced, rendering humans increasingly incapable of choosing between the good and the bad.

In Ellul's staging of the conflict between man and technology, we can identify a series of central conceptual oppositions: universal technology/particular culture, the simultaneous specialisation/totalisation induced by the system, the internal rationality of the system/the irrationality of its consequences. The universality of technology appears from three different perspectives. First, technology is universal in that it infiltrates every life domain (e.g., sports, sex, art, religion). Second, technology is universal as it extends around the globe and undermines cultural differences. While premodern technologies were included within a specific culture, which usually made transcultural comparisons absurd (in the same way that the art of a society cannot be said to be objectively superior to the one of another), the universality of modern technology forces transcultural comparisons: countries are all regarded as more or less

advanced on the same track. Third, from a temporal perspective, the conflict between the universality of technology and the particularity of culture can be regarded as follows:

“Each society is the result of slow evolutions, of progressive creations. It draws its substance from an accumulation of past experiences. It cannot cut its roots without falling apart. Technology [(Technique)], however, is a thing of the present and looks to the future. It gradually effaces its own past. Yesterday's machines are now valueless. The automobiles of 1950 are laughable.” (Ellul 1988, p. 59).

Since there is only one universal track of technological development, the past stages of technology do not really matter, they are only inferior versions of the same. And the history of technology is not interesting as it does not reveal any contingent social choices explaining the present, but a succession of necessary steps. On the contrary, the history of a society enables us to understand how a complex combination of events shaped it as particular and different from all others.

The simultaneous specialisation and totalisation induced by the technological system, largely explains the dynamics underlying its autonomous development. Technological progress requires a constantly increasing specialisation of technicians – as technical knowledge accumulates, they can only contribute by focusing on a very limited domain. Every technician is led to develop efficiency in a very limited field, while the system combines all their specific advances in ways that no one had envisioned. According to common sense instrumentalism, technology is a means developed to reach certain ends, but this is a mistake: “technology does not develop in terms of goals to be pursued but in terms of already existing possibilities of growth” (1977, p. 256), it is “pushed from behind” (1977, p. 272). The only objectives are the ones established by each technician in his own speciality and consists in pushing forward the limits of the possible: “We can now do this in this area of activity. But we stop at this point; we cannot yet do that. The objective is to succeed in doing what is still impossible today” (1977, p. 269). When non-technicians (capitalists, administrators, politicians) attempt to assign objectives to technological development, it is disastrous for research and no progress can take place. Although we often think that it is necessary to identify a problem before finding a solution, in fact, the technological system constantly creates “solutions” where there was no problem.

The paradoxical irrationality resulting from the functioning of a system governed by a form of reified rationality is a common theme in critical theory since Marx and Lukàcs: “It is evident that the whole structure of capitalist production rests on the interaction between a necessity subject to strict laws in all isolated phenomena and the relative irrationality of the total process” (Lukàcs 1922, p. 105). However, I believe it takes on a specific form in Ellul’s works. The tension there is essentially between, on one hand, the possibility of reaching a completely rational and dystopian society comparable to Aldous Huxley’s *Brave New World*¹² (1932), and on the other, the proliferation of technological risks and disasters. In sum, will the development of the technological system lead us to a perfectly stable and rational totalitarianism (possibly

¹² Aldous Huxley helped to introduce Ellul’s first major work on technology (*La Technique ou l’Enjeu du siècle*, 1954) to the English-speaking world by bringing it to the attention of publishers.

enhanced by transhumanism) or only multiply unpredictable technological disasters (possibly culminating in a global ecological collapse)? Although the two alternatives are present in Ellul's writings, I would argue that the second dominates. The first outcome could be produced by the total incorporation of the technological society within the technological system:

"I have shown that the technological society should not be confused with the technological system. The system has its locus in society. It determines almost all orientations and structures, but it does not incorporate everything. That is, society largely overwhelms the system, its institutions are not strictly technical, it carries a whole ensemble of ideologies, survivals of the past, or myths, and constitutes itself as Castoriadis has remarkably shown, through the 'social imaginary'. Mores and customs remain at the margins of technology." (Ellul 1988, p. 58-59).

In the pages following this paragraph, Ellul suggests that such "survivals of the past" might not survive very long as society progressively gets incorporated within and reduced to the technological system. The stable-totalitarianism option also seems to underlie the repeated claim made by Ellul that technology calls for a strong centralisation of power and that, for this reason, the Soviet Union would eventually win the Cold War. However, it is the theme of uncertainty and unpredictability which dominates. The development of technology is fundamentally chaotic and full of risks: "We are moving into a world which is increasingly the product of technology. But we are also experiencing an increasing uncertainty regarding these technologies (not regarding their origins or mechanisms, but their effects)" (Ellul 1988, p. 87). One of the major drivers of technological development is the disasters provoked by technology itself: we constantly try to develop technology to solve the problems caused by other technologies. Ellul further claims that technological progress always creates problems greater and more complex than the ones it solves (1988, p. 110). Today, a good example of this phenomenon is the rising call to use geo-engineering as a solution to global warming: if global warming results from technological development and probably represents the greatest problem of our generation, there are good reasons to think that trying to solve it through geo-engineering would only multiply its magnitude and complexity.

Does Ellul envision any emancipatory perspective? According to Feenberg, substantivist theories generally put that their only hopes in "a vaguely evoked spiritual renewal that is too abstract to inform a new technical practice" (1992). Indeed, this perfectly fits the Heideggerian approach (1954) and to a great extent the Ellulian one. To get a more precise view of Ellul's position however, we should bear in mind that he is both an anarchist and a singular protestant theologian. These two elements feed each other: Ellul's thesis is that the message of the Christ, if well understood, directly leads to the rejection of overarching instituted powers such as the State, Capital, or Technology. During most of his life, Ellul's diagnosis was deeply pessimistic. He did not see any way out of technological alienation, apart from a Christian-inspired "vaguely evoked spiritual renewal". However, during a short parenthesis (between the publication of "*Changer de Révolution. L'inéluctable prolétariat*" in 1982 and the one of "*Le bluff technologique*" in 1988) he believed in emancipation through revolutionary change. Noteworthy is the fact that, for Ellul, this revolutionary transformation was rendered possible by the rise of digital technologies. By themselves, digital technologies would not lead to

emancipation, but for a short moment, he reckoned they made the technological system flexible enough to be re-appropriated and oriented towards freedom by a potential revolution inspired by libertarian socialism. What are the reasons advanced by Ellul to reject the idea that informatisation and technological development, by itself, could lead to a form of emancipated society: after all, if technology determines society, why couldn't it lead it to its emancipation? First, a philosophical argument: necessity (determinism) is the opposite of liberty and cannot lead to it. Liberty can only result from conscious action, technology should be mastered and bent to our conscious will. Automation could enable a massive reduction of labour-time (if class struggles were able to impose them politically), but free time does not mean much in itself, Ellul claims, all depends on what is done with it: society could fall into meaningless consumption and entertainment – in what Arendt called a “society of labourers without labour” (1958, p. 5). Second, a brief overview of the history of technology leads to a reasonable suspicion: plenty of inventions were supposed to bring about decentralisation and did not – Ellul develops the example of the electrical engine (Ellul 1982, p. 220). Third, he asks: “who will really need complex computers, who will use databanks?” (1982, p. 220). In the economic domain he argues, it will not be the small artisan, shopkeeper, migrant worker etc., only (relatively) big business can be concerned – economies of scale will play the same role as in the industry. Similarly, in the political domain it will not be small groups but only powerful trade-unions or parties. Thus, “if the possibilities of decentralisation increase, the *inseparable* centralising factor has an even stronger influence” (1982, p. 220). Today, promoters of information technology usually dismiss such arguments as outdated since personal computers are widespread and commonly used. On the contrary, Ellul seems to me rather prescient on this point: do individuals collect and process big data? No, only transnational firms and states do¹³. Collecting, storing or processing big data requires important and costly infrastructures that only large administrations can afford. In addition, it is difficult to imagine how individuals could find uses to big data.

What kind of revolution was envisioned by Ellul to appropriate and reorient the new information and communication technologies (ICTs) towards emancipation? A profound and unprecedented one based on five elements. First, a massive and unconditioned aid to the Third World so that it can benefit from western technology and self-organize. Second, the deliberate choice of “non-power”, that is renouncement to the military apparatus and radical suppression of the bureaucratic state. Third, the promotion of diversification, localism, and the break-down of administrations in smaller entities in both the economic and political sphere, whose decentralised coordination should be made possible by ICTs. Fourth, work should be completely re-organized and divided in two sectors: on the one hand, labour-time in a highly-productive and automated industrial sector should be shared and drastically reduced to about two-hours a week, on the other hand, anyone should be able to work voluntarily for the remaining time, in a low-productivity sector including crafts and agriculture. Fifth, the high-productivity sector should produce basic goods that would be distributed equally. Needless to say, some aspects of this revolutionary project are highly utopian and quite un-strategic. Here

¹³ However, this centralising aspect of digital technologies, as we will see, was not a necessary effect of their development. It was only a potentiality which has been actualized because it served the interests of dominant social groups.

again, the ends are strongly implied by the means and hence the means should remain perfectly moral. No doubt that the Christian inspiration of Ellul as well as the trauma of the Russian revolution lie behind much of his political views. Nevertheless, Ellul thought digital technologies were absolutely necessary for emancipation: automation permits the reduction of labour-time while informatisation enables the coordination of local, decentralised political and economic entities. Since the days of Jesus Christ he argues, and even more since the emergence of modern anarchism in the 19th century, revolutionary desires existed and led to political experiments. However, they could only fail by lack of technical means: in the absence of digital technologies, the disorder provoked by a socialist revolution could only lead to an authoritarian reaction. With the rise of digital technologies, the means finally came to exist but the revolutionary will was found missing. In 1982, Ellul claimed that if the revolutionary reorientation of the technological apparatus did not occur within a few years, digital technologies would be incorporated into the existing system and their emancipatory potentialities neutralised. By 1988, his hopes for emancipation were definitively lost.

Constructivism

Since the 1980s, the field of Science and Technology Studies (STS) has been largely dominated by constructivist approaches, which multiplied case studies of particular technical objects or systems, have been rather critical of earlier philosophical and critical theories of technology and provided convincing empirical evidence to refute techno-determinism. As we have seen, techno-determinism holds two propositions: unilinear progress and determination by the base. In fact, the thesis of unilinear progress contains two claims of unequal plausibility: first, that technology progresses from lower to higher levels of development, second, that this development follows a single sequence of necessary stages, a unique track (Feenberg 1992). The first claim is common, plausible, and not necessarily deterministic. Rare are the writers who, like the anthropologist Pierre Clastres (1974), consider that modern technologies are not superior to the ones of primitive societies¹⁴. Castoriadis for instance, recognizes the existence of a form of progress in the field of technology (although this progress is not deterministic and is not associated to any moral or cultural progress): “The H-bomb is a progress over flint, for instance, since it can kill much more and better than flint. But there is no such thing as progress for fundamental things. There is neither progress nor regression between the Parthenon and Notre-Dame de Paris, between Plato and Kant, Bach and Wagner, the Altamira cave drawings and Picasso” (2010, p. 7).

Constructivism highlights contingency and choices rather than necessity in the history of technology. In its critique of techno-determinism, it has particularly attacked the idea that technological progress is unilinear and, I would even say, has definitively demonstrated its falseness. Contrarily to what Ellul believed, there is not at any given moment, only *one* technical means which objectively imposes itself as the most efficient. Constructivism shows that technological development is underdetermined by technical criteria. First, there is generally more than one technically viable solution to any given problem, which means that social actors make a choice among them. Second, there are often conflicting and evolving interpretations of the problem itself, hence different solutions to it. There is no more grand opposition between the particularity of culture and the universality of technology. Society and technology are much more closely tied together than what was previously thought: the history of technology is the one of society, it is a history of contingent choices that constructed every society in a particular way.

¹⁴ “If by technology we mean the ensemble of methods used by men, not to reach an absolute mastery of nature (this is only valid for our world and its mad cartesian project of which we are only starting to measure the ecological consequences), but to reach a mastery of the natural environment that is appropriate and relative to their needs, then we cannot by any means speak of a technological inferiority of primitive societies: they demonstrate an ability to satisfy their needs which is at least equal to the one that the industrial and technological society takes pride in.” (Clastres 1974, p. 105)

David Noble and the social construction of industrial technology

David Noble is a historian of technology – with a Marxist background – who wrote important works in the late 1970s and early 1980s that empirically confirmed the intuitions of the New Left: technological progress is not an autonomous/objective/universal force, on the contrary, the direction it follows is strongly shaped by capitalist interests. He strongly opposed techno-determinism as a false idea which has limited the perspectives of the left since the early 19th century. He affirms it has delegitimated the workers direct perceptions and intuitions about technology and, forced them to accept every innovation as objectively progressive although they constantly deskilled work, reinforced the control of management, and reduced the workforce. Against Marx, Noble argues that the luddite strategy of machine-breaking was far from being irrational, infantile or reactionary. The industrial workers who destroyed over one thousand mills in the Nottingham area between 1811 and 1812 were not against technology *per se*, nor were they fascinated by progress and confused by techno-determinism. They simply perceived that new machines were used by capital to restructure social relations at their expense. They considered that the rapid and unplanned introduction of new machines could only bring unemployment in the short term, while reinforcing the power of managers over workers. Thus, they demanded a greater control of workers over the direction of technological development and the rhythm of introduction of new machines.

Their understanding of the political bias of technology – based on their direct experience rather than abstract theorisations – was actually correct and it took about a century and a half to critical theories to catch up with it. The luddite strategy was not so much debated and rejected by the workers movement but, condemned as nonsensical and dangerous as the techno-determinist understanding of progress became hegemonic. On the contrary, Noble contends that it has been quite successful to buy time and develop class consciousness. The works of David Noble focus on the social construction of technology in the conflictual context of the industrial factory. They are precursory of the constructivist sociology of technology that developed a few years later but remains more critical and rooted in a Marxist paradigm. I will reproduce here some of his main arguments highlighting the political dimension of technology developed in one of his late books (Noble 1995).

According to Noble, most people half-consciously conceive technological development as autonomous and based on a sort of Darwinian process of selection. Technologies would undergo two selection filters or screens to which only the fittest survive: a technical screen and an economic one. The technical screen is constituted by all the scientists and engineers, dedicated to technological rationality and its quest for efficiency, who methodologically examine all technological possibilities and select only the best solution to any given problem. The economic screen is twofold. First, there is the hard-headed businessman, impersonating economic rationality and its quest for profit, who selects only the economically viable technologies among the technically superior ones. Second, the impersonal mechanism of the market guarantees that clumsy businessmen will fail. This view leads us to think that technologies widely used in the industry are absolutely the most efficient at any given moment, that they represent “the best history had to offer” (Noble 1995, p. 72). David Noble contends that these two screens do not at all avoid technological development to reflect and reinforce

existing relations of power at every turn. I would add to his argument that the economic screen is not universal but only relative to capitalist societies – which do not necessarily represent the best history has to offer.

For Noble, the work of engineers constantly reflects their relation to those in power, that is, “in our society, those with money or those with political, military or legal authority” (1995, p. 73). Engineers usually recognise that they depend on power-holders in many respects but rarely admit that this influences their technical work. Their work is essentially driven by technical considerations and they sincerely try to do it for the good of society: “Yet, consistently, again and again, they turn out solutions that are good for the people in power (management) but often disastrous for the rest of us (workers)” (1995, p. 73). There are a couple of reasons explaining this paradox. A first one is that engineers usually do not have any contact with workers. During their education and professional careers, they typically communicate with managers only, hence they tend to adopt their worldviews. They are taught that the managers’ perspective is the most objective way of looking at the enterprise, though it is in fact a view from the top, the one of power. From this perspective, workers systematically appear as objects of manipulation integrated to the technical system of the factory. Moreover, the viability of a design is not only technical or economic but largely political: “a technology is deemed viable if it conforms to the existing relations of power” (p. 75). To illustrate this idea, Noble invites us to picture him giving a talk to an audience. He would tell the audience that he has developed a new technical system enabling the audience to produce some widget in half the time that it conventionally takes. Only, a central operating feature of the system is that he would take all decisions and completely control the activities of everyone in the audience. In that case, he would most probably be thrown out. However, if Noble presented the same technical system to any high manager in the industry, he would probably appear as a genius and get hired by the company to implement it. The same technical system is ridiculed in the first case and praised in the second. That is because Noble does not have the power to force the audience to follow his instructions in the first case, while in the second, the manager knows he can force workers to execute his orders. Reciprocally, Noble tells us to imagine that after discussing with the audience, he managed to redesign the technical system so that it gave each person the same decision-making power. Such a system would then be dismissed as absurd by the industrial manager: why would he ever accept a technical system designed to give workers the same decision-making power as managers?

Control, Noble insists, is the major obsession of management. Managers usually justify it in terms of economic efficiency but the truth, Noble claims, is that control is less a means to other ends than an end in itself. Managers will do what is necessary to reinforce their power, whatever the technical, economic or social costs. The example of Cyrus McCormick’s reaper manufacturing plant in Chicago in the 1880s provides support to Noble’s view (Winner 1980). In this case, a largely untested innovation (pneumatic moulding machines) was bought for about 500,000\$, even though it produced inferior castings for a higher cost. The reason is that McCormick II was engaged in a battle with a union organized by his skilled workers. The new machines were meant to be used by unskilled workers, which enabled McCormick II to significantly replace his workforce and break the union. The machines were abandoned only three years after their acquisition, but they had already accomplished their purpose. Noble even

suggests that management's obsession with control might be the main factor explaining the trend towards the substitution of labour with physical capital. Since the early days of the industry, technology has been enrolled by management in its will to discipline the workforce. For instance, Charles Babbage, a famous engineer considered to be the father of the modern computer, expressed himself in those terms in 1832: "a great advantage which we may derive from machinery is from the check which it affords against the inattention, the idleness, or the dishonesty of human agents" (quoted in Noble 1995, p. 78). Engineers also have objectives which fit well with the ones of managers. They aim to develop error-free systems whose operations remain faithful to the intentions of the designer. They tend to see human intervention as a chance for error rather than for creativity or enhancement, and thus try to exclude it as much as possible. A common expression for this is "idiot-proofing". In practice this means creating designs that restrict intervention by everyone except engineers and managers, in other terms, by workers. Noble notes that each time that more respectful designs were proposed by engineers, they were eventually abandoned by lack of support and funding. Fantasies and various sorts of ideas also play a role in the drive towards automation. Andrew Ure (a famous 19th century theorist of manufactures) described the factory as a vast automaton, a self-acting machine, almost forgetting the workers that made it function. In his vision, the workers seem reified, reduced to cogs in the factory's mechanism. Similarly, Dr. C. C. Hurd (a director of applied science at IBM) saw the computer as the best analogy for the assembly line. The dream of a perfectly ordered world of machines, functioning neatly without men, runs through the history of the industry and has motivated some of its major protagonists. Noble suggests that the fascination for automation is closely linked with the desire to artificially create life, which would be an ageless male preoccupation rooted in men's will to compensate for their inability to give birth.

The economic rationality imposed by the economic screen should not be overestimated either according to David Noble. People commonly assume that companies automate to increase profits. Neoclassical economics also tells us that businessmen only invest in machinery if its cost is lower than the cost of labour. Unconvinced, Noble started to question this premise: do businessmen have any evidence of the cost-effectiveness of new machines before investing in them? An economic article fuelled his doubts (Piore 1968): the author did a survey in sixty factories and found that, whether the cost of labour was higher than the one of machines or not, companies bought machines. There was an irrational bias in favour of machinery. Noble's own inquiry led him to the conclusion that managers rarely purchase new machines based on serious evidence about their cost-effectiveness. It is usually once the equipment is installed that efforts are done to justify it economically and to render it economically viable. A variety of methods of "creative accounting" exist to justify such acquisitions by spreading data among divisions of a company. And anyway, post-audits are almost never realised to verify whether acquired machinery brought about the expected benefits. Generally, the more sophisticated and fascinating a machine is, the more management is willing to invest in it. Some machines are even sold at extravagant shows – comparable to boat shows or automobile shows – to which managers go to relax, socialize, and where they tend to buy compulsively. Managers are not safeguarded from collective urges either; when they see that other companies are automating, they feel the need to automate too. Does market competition correct these biases by rewarding

rational businessmen and forcing others into bankruptcy? Not really, according to Noble. First, because the state often has a decisive role in technological development – especially in the case of automation in the US – and massively supports projects that the market would not. Second, because most markets quickly tend to become oligopolistic and dominated by large corporations, whose “sheer economic (and thus political) muscle enables them to corner markets, intimidate or ‘acquire’ competitors, and thereby distort beyond measure the real costs of doing business” (Noble 1995, p. 97).

Noble is right to demystify the over-idealized visions of the economic rationality imposed by market competition on economic actors, by describing their real behaviours at a micro-level. However, we should avoid the opposite excess of neglecting the importance of this economic rationality which, at a macro-level, has a decisive explanatory power to understand the historical trend towards rising productivity since the early days of industrial capitalism.

Social constructivism and Actor-Network Theory

Constructivist sociology of technology developed in the 1980s and took two main directions: social constructivism and actor-network theory. The methodological apparatus of social constructivism was first developed in the sociology of scientific knowledge (SSK) before being adapted to the study of technology. Social constructivism argues that scientific theories and technologies are underdetermined by scientific or technical criteria. Three concepts are central to social constructivism: interpretative flexibility, symmetry and closure. Regarding science, interpretative flexibility means that scientific experiments are open to more than one interpretation. Nature does not provide enough information to resolve the scientific controversy, thus social factors intervene to reach “closure”. Symmetry is meant to be applied to the losers and winners of scientific controversies. Rather than assuming the superior rationality of winners from the outset, the sociologist should explain true and false scientific beliefs similarly. The reason for this is that scientists (and people in general) do not believe in a theory “because it is true”. They can only believe in the truthfulness of a theory based on the arguments supporting it. SSK thus describes how scientific theories come to be accepted by the scientific community after controversies, insisting on the influence of social factors in the process (e.g., money, power, gender, personality, ambition) and sometimes flirting with epistemic relativism.

In technology studies, “interpretative flexibility” concerns the purpose and meanings attached to a technical device and its uses. Most often, there are different social actors with different interpretations of the nature of the problem to be solved by a technical artefact, system or process, especially in the early stages of its development. Therefore, these groups struggle to realize their purposes in the design of the technical device and the result crystallizes the winners’ interests and worldviews. Closure occurs when a consensus over design is found or when competitors abandon. Symmetry is applied to the treatment of the competing designs, so that the controversy can be viewed from the perspective of contemporary observers who saw the range of technological alternatives of the time. A very famous illustration of this approach is the history of the bicycle proposed by Trevor Pinch and Wiebe Bijker (1984). Our current bicycle has two ancestors that used to compete against each other: a sport’s bicycle with a high front wheel and a small rear wheel, which was fast but unstable; and a transportation bicycle with equal-sized wheels, which was safer but less exciting. The safer design was eventually chosen and benefitted from all following improvements. Retrospectively, the sport’s bike looks like a lower stage in the same technological development. However, the two designs were competing for years and none was a stage in the other’s development: the sport’s bike addressed different purposes and had other supporters, it represents an alternative path of development.

Technological development branches in many directions and could generally reach higher levels on more than one track. Determinism gives the impression that “the end of the story was inevitable from the very beginning by projecting the abstract technical logic of the finished object back into the past as a cause of development” (Feenberg 1992). The notion of interpretative flexibility highlights a hermeneutic dimension of technological development which is often ignored. It shows that society does not only influence superficial/external factors in the development of technical artefacts (pace of development, aesthetics or uses), but also their internal functioning, their rationality. Social constructivism also insist that the influence

of society over a technical artefact or a large technical system is generally stronger in the early phases of its development, before closure. As Thomas Hughes argued, large technical systems can be both a cause and an effect, they can shape and be shaped by society, but as they consolidate, “grow larger and more complex, systems tend to be more shaping of society and less shaped by it” (Hughes 1994).

The actor-network theory (ANT) was developed by authors such as Bruno Latour, Michel Callon and Madeleine Akrich. It adds another layer of symmetry to the methodological apparatus of constructivism: the symmetry between humans and non-humans (be they “biological” or “artificial”). ANT proposes to break with a series of binaries that are constitutive of modernity and often accused of supporting modern forms of domination: nature vs. culture, science vs. politics, subject vs. object, human vs. non-human, etc. This sophisticated theory challenges all sociological traditions by rejecting conventional understandings of the notion of “society”: an environment within which social actors evolve and an environment essentially composed by humans and their institutions. Society would not be an environment in which actors evolve, but the temporary result of their actions. And these actors include both humans and non-humans. Social constructivism tends to dissolve nature within society according to ANT. A solution which it does not find much more convincing than the traditional one, consisting in separating them completely: science being concerned with nature and allegedly pure from any social influence, while politics would be concerned with society and allegedly pure from any natural influence. Instead, ANT suggests that the sociologist should reject this notion of society and focus his attention on how diverse actors come to associate or dissociate themselves to (de)compose sociotechnical networks.

The intentional acts of humans and the causal power of things should not be sharply distinguished ANT argues, nor the former be given privilege over the latter. The world is composed of sociotechnical hybrids and all actors are comparable in so far as they are endowed with agency. Latour illustrates this point by telling the story of his struggle against an automatic seat belt (1992). One morning, he felt in the mood to break the law by refusing to fasten his seat belt while driving. Automatically, the car flashed a red light reading “Fasten your seat belt!” while a high-pitched, repetitive alarm annoyingly rang. After no more than thirty seconds he resigned and reluctantly fastened his seat belt to stop the alarm. The question then is, where is the morality? In the human or the non-human? Latour could also have fastened his seat belt from the beginning, incorporating the good behaviour expected from him by the police, the law and the car. Or an engineer could have designed his car in such a way that it simply could not be started without having the seat belt on. Where is the morality in all these cases? “In the electric currents flowing in the machine between the switch and the sensor? Or in the electric currents flowing down my spine in the automatism of my routinized behaviour?” (Latour 1992). The display of all these possibilities intends to highlight the continuity between the agency of humans and non-humans and suggest that it is arbitrary to attribute morality only to the former. What would matter here is whether the assemblage of humans and non-humans respects the law.

Michel Callon (2013) developed another example to illustrate how permeable are the categories of social and technical. After years of research & development (R&D), EDF (the former French

public monopoly over electricity) proposed in 1973 a thorough project to develop electrical vehicles meant to replace the thermal automobile. The project appeared both social and technical in that it contained an in-depth description of the social context in which the technical objects were meant to spread. EDF argued that France was living a social or civilizational crisis: May 68 remained present in the minds of all and the car concentrated many criticisms (e.g., pollution, individualism) while symbolizing a declining industrial society. Electrical vehicles would reduce pollution and could be the starting point of a new era of public transports. EDF also envisioned a technological path which required investment and R&D: lead accumulators could quickly be used with a few ameliorations, then zinc/air accumulators should be able to replace them. At first, Renault (the leading French automobile firm) was stunned and did not react to this threatening sociotechnical scenario. A few years later though, it came up with an alternative one. What EDF called social, Renault called it technical and vice-versa. According to Renault, the social context had changed: social movements were declining and individualism was on the rise. People had nothing against cars, they were only frustrated with the stagnation of technological progress. The social analysis developed by EDF was thus countered with technical solutions: Renault displayed the range of possible improvements of the thermal engine. The private company also accused EDF's technical vision of being purely social: the zinc/air accumulators were mere dreams of engineers; they had no chance of ever functioning. Renault eventually won the controversy. Michel Callon's argument is that EDF did not lose for purely technical reasons: the public company only failed to mobilise a lasting coalition of humans and non-humans (e.g., zinc/air accumulators, administrators, investors).

The limits of constructivism

Applying the principle of symmetry to scientific controversies can be problematic if it confuses different forms of symmetry such as epistemic symmetry (between true and false beliefs) and rational symmetry (between rational and irrational beliefs) (Dubois 2002). Indeed, a symmetrical treatment of a belief supported by rational/scientific arguments and a belief supported by religious arguments or “fake” science (purposely biased to serve specific social interests) is dangerously misleading. Constructivist SSK has sometimes achieved a laudable work by giving a more realistic description of “science in action” (Latour 1987) which relativized the authority of science, formerly based on an ideological over-idealization of its objectivity. On other occasions however, it has fallen into the trap of epistemic relativism.

The postmodern tendency to flatten the differences between premodern and modern societies and to reduce rationality to a nonrational origin such as western or patriarchal ideology, is both implausible and politically problematic. The praiseworthy efforts to limit technocracy and open a space for dialogue between lays and experts, should not lead to dismiss science as such and ignore the high epistemic standards supporting it. Science is a social activity and cannot fully escape the influence of social factors. Yet, its products are not fully submerged by society and they have more than just a local validity. In addition, science’s quest for truth and objectivity sometimes imposes limits on political power’s will of manipulation¹⁵: the works of climatologists and diversions of climate deniers (often funded by the fossil industry) is here to remind us of this basic truth. The postmodern argument for epistemic relativism and the indistinction of modern/premodern societies ironically bears the mark of very modern pathologies of hyper-subjectivism and what Arendt (1958) used to call the “alienation from the world”. Epistemic relativism is of little practical value against technocracy anyway: “practical questions of technology are not taken on epistemological grounds [...] whatever the ultimate status of scientific-technical knowledge, it is what we *use for truth* in making policy” (Feenberg 1999, p. 14). Despite its subtlety, Latour’s claim that we’ve never been modern reproduces this postmodern fallacy (1991): it is not because modern societies draw networks between society and nature like premodern societies did, that these networks are comparable. The symmetry between, on one side, the modern man who draws links between the hole in the ozone layer (natural), aerosols (artificial) and governments (social) signing an agreement to ban them, and on the other side, the premodern man who draws links between his gods (social) and the rain (natural), is somewhat limited and distinct in terms of rationality.

From the point of view of philosophers and critical theorists of technology, the rise of constructivism appeared both interesting and disappointing. Interesting since it gave a more acute understanding of technological development and refuted determinism and its sterile fatalism. Disappointing by its lack of critical content, its “blasé, depoliticized scholasticism” (Winner 1993). The careful depiction of the social construction of a technology generally left out of view the social consequences of that technology. Determinism neglected the origins (the

¹⁵ The idea that resisting to State power’s unlimited will of control by holding on to basic truths is a fundamental condition for freedom, is the central theme of George Orwell’s 1984: “Freedom is the freedom to say that two plus two make four”, as the main protagonist, Winston Smith, repeats. I believe this is indeed a necessary – though insufficient – condition for freedom.

social construction) of technologies and focused on their social consequences (often overestimating the necessity of the link between a technology and a social outcome), while constructivism focused on the origins of technologies and often neglected their implications. The devotion of constructivist scholars to the value-neutrality of social sciences lead most of them to reject any normative judgement over technological developments, hence, to depoliticize their discipline. Wiebe Bijker (1995, p. 5) has argued that this was just a temporary “detour into the academy” meant to establish the field as a social science. The issue remains but it is true that some efforts are made to politicize STS (e.g., Jasanoff et Kim 2015). Another problem of constructivism is that it generally focuses only on factors of technological change that are directly observable (the immediate interests, views and actions of specific groups) and disregard more invisible factors rooted in wider social structures, such as the class structure of society underlying every institution in the Marxian framework, or the modern “revealing” of nature as a “standing reserve” ready to be instrumentalized in the Heideggerian one.

Sheila Jasanoff formulates a series of criticisms against ANT which I find very relevant (2015, p. 15-19). First, it risks establishing a problematic normative equivalence between human and non-human agents. Second, only humans are gifted with imagination, which represents “a crucial reservoir of power and action”. Third and foremost, ANT suffers from its own fecundity. As it is too distributive in attributing cause and agency, it risks making all actions and agents seem equally empowered or disempowered, thus equally responsible or irresponsible for the networks within which they evolve. By disaggregating society into a multiplicity of networks, ANT encourages a micropolitics concerned with modest issues (e.g., the structure of seatbelts or toothbrushes) often opposing minor actors while leaving more macro, abstract but decisive forms of domination untouched (e.g., capital, bureaucracy, patriarchy). This appeared clearly in the declarations made by Bruno Latour in the middle of the Yellow Vests’ movement (Reporterre 2019). He did not condemn the Yellow Vests and even said that they testified of a “reassuring political energy” but he gave them strategical advises that seemed properly outlandish. Latour argued that their way of doing politics was outdated in that it directly wanted to address global, general issues. Calls for social justice, participatory democracy, taxing the wealthy, saving the planet or smashing capitalism are too abstract, he reckoned. Instead of addressing general demands to the state or seeking its revolutionary takeover/dismantling, people should give a precise description of their conditions of existence to understand the sociotechnical networks they are involved in, the resources they depend upon, and the actors who limit their access to these resources. A sort of gigantic research project in sum.

“The problem is that we must renew ties, anchoring: ‘You Madam, you Mister, you entrepreneur, what are the resources that you are depending on? The depiction of your dependency will reveal that, what you need, someone who is here and that you can name is depriving you of it’. And this person is not ‘capitalism’, it is not ‘the rich’, it is not ‘Macron’ ... but it might be your colleague or your neighbour” (Reporterre 2019).

Here appears rather plainly the implications of Latour’s rejection of macro-social concepts, of his efforts to understand social antagonism in its complexity by avoiding to organize it around one or a few central lines of conflict, be it the capital/labour opposition of the Marxist framework, the people/oligarchy opposition of the populist framework (Mouffe 2018), or the

dominant/dominated opposition characterizing other approaches (e.g., Bourdieu). It risks dissolving politics into an infinity of (often derisory) micro-conflicts and, ultimately, to tell the poor and dominated to fight each other for crumbs while preserving the core structures of domination.

Finally, we should be careful not to get from the description of the social construction of technology, the misleading impression that society “controls” technology consciously and sovereignly. What does it mean to say that “society controls technology” anyway? Does society “control” any of its institutions? In what sense? Does society control its political institutions (the state)? Castoriadis for instance, defines the state as a “hierarchically organised bureaucratic apparatus, separated from and dominating society” (1996). Does society control gender relations? In what sense? All social institutions, once they are instituted, tend to escape society’s control and to function on their own. We will have to get back to this point but, for now, I simply propose to highlight some of the main factors limiting society’s control over technology.

First, technological development has a multiplicity of major unintended and unpredictable consequences – most of Ellul’s arguments on this issue remain perfectly valid¹⁶. The more a technology is complex and powerful, the more its consequences are unforeseeable and massive. Second, the fact that technological development depends on social choices does not mean that these choices are fully conscious. Many decisions taken by individuals or groups are motivated by unconscious desires, imaginary representations that have not been reflected upon. Third, society is divided in different groups with asymmetrical power and this includes their power to influence technological development. Fourth, there is a phenomenon of path dependence in the sense that past social decisions over technological development have major implications over the range of possibilities in the present. For example, if a country has chosen to use predominantly nuclear energy, it will have to deal with nuclear waste for the many centuries that follow, and deal with the delicate dismantling of power stations if it ever wants to change path. Also, as technological progress is not unilinear, branches that have been abandoned in the past might be closed forever, and it may be necessary to pursue on the same track – or risk a brutal regression. For instance, since industrial technologies have been shaped by the domination of capital over labour for more than two centuries, to what extent these technologies can be used in an anti-capitalist project of emancipation? Fifth, generally, the larger and the more complex a technical system is, the less it is suited for a democratic, self-managed governance, and the more it facilitates the emergence of social hierarchies.

Sixth, one major problem of collective action regarding the shaping of technology comes from competition at different levels (e.g., individuals, states, companies). Even if an individual/society/state/company does not want to adopt a technology that it considers noxious in many respects, it might feel forced to adopt it. As Olivier Rey puts it: “any refusal of the enslavement to technology entails the enslavement to those who possess technology” (2014, p. 210). Indeed, many states (and sometimes even their societies) feel the need to develop all sorts of military technologies (e.g., nuclear bombs, autonomous lethal robots) to remain independent and safe in a context of international arms race. Similarly, a major argument for GMOs or more recently for the 5G, is that “we have no choice”, we must not be “left behind” in the

¹⁶ See chapter “L’imprévisibilité” in “*Le Bluff Technologique*” (Ellul 1988).

technological race. This competition is a major factor driving technological development towards aims of power, rather than autonomy, well-being or aesthetics for instance¹⁷. Institutions promoting cooperation at every concerned level (from inter-individual to inter-state relations) and to various extents have existed and may be strengthened, but they are extremely difficult to establish and non-cooperative behaviours remain a constant threat.

In sum, social constructivism and the Actor-Network Theory have made a major contribution to the understanding of technology by refuting the thesis of unilinear progress and shedding light on the social construction of technology. However, we have pointed out some of their limits, which mostly reside in a loss of the critical content that characterized earlier theoretical approaches to technology. The next sections will attempt to show that the philosophies of Andrew Feenberg and Cornelius Castoriadis can form the base of a critical theory integrating the main lessons of constructivist STS, that is, of a critical constructivism.

¹⁷ It also represents what Hardin (1968) called a tragedy of the commons scenario. See Chapter 2, Genealogy of the Commons Discourse, Enclosures.

Andrew Feenberg's Critical Constructivism

Democratic rationalization

Andrew Feenberg is a direct heir of the Frankfurt School tradition of technology critique and especially of Herbert Marcuse (who supervised his doctoral thesis in the early 1970s). His approach (critical constructivism) represents one of the most convincing proposals to revise this tradition in the light of the empirical findings of constructivist STS. It forcefully rejects both techno-determinism and naïve instrumentalism to understand technology as an essential scene of social struggles. Modern forms of domination he argues, are based on the technical mediation of a variety of social activities (e.g., production, medicine, communication), which implies that democratization requires radical technical as well as political change. Feenberg's concept of democratic rationalization enrolls constructivism in an argument against Max Weber and other substantivist authors like Ellul or Heidegger. While substantivism based itself on an essentialist and universal concept of rationalization to claim that techno-economic development inevitably leads modern societies towards more domination and hierarchy (to the "iron cage" of bureaucracy), Feenberg argues that the dominant model of industrial society is politically contingent. The notion of democratic rationalization challenges the substantivist dichotomy between rational hierarchy and irrational protest: "If technology has many unexplored potentialities, no imperatives dictate the current social hierarchies" (Feenberg 1992). Initially, democratic rationalization took the form of a radical call for self-management and libertarian socialism which was perfectly in line with Marcuse and the New Left. Over the years however, Feenberg seems to have tempered his utopian hopes. Self-management was not abandoned as an ultimate normative horizon, but the concept of democratic rationalization was widened and softened to focus on any democratic interventions in the technical sphere and promote constructive dialogue between lay and experts.

Technology cannot be explained only by its functional logic described by technical disciplines, it is also filled with hermeneutically interpretable meanings which require humanistic methods. Technical objects have two hermeneutic dimensions according to Feenberg: social meaning and cultural horizon. The first dimension is well-described by constructivist sociology. It corresponds to the complex interactions between social meaning and technical function that directs the path of technical progress (e.g., history of the bicycle). The second dimension corresponds to an above-mentioned blind spot of constructivism: its focus on immediately observable actors and their interactions masks the influence of wider social structures. The cultural horizon consists in general assumptions (cultural norms originating in economics, ideology, religion, tradition) forming the unquestioned background of everyday life. It supports social hegemony defined as "a form of domination so deeply rooted in social life that it seems natural to those it dominates" (Feenberg 1992). At this level, a critique of capitalism's influence on modern technology becomes thinkable. Marcuse (1965) for instance accused Weber's analysis of rationalization to confuse the control of labour by management with the control of nature by technology. While the search for the control of nature is universal, management only develops with the capitalist wage system. Under capitalism, since workers are separated from the means of production and from the product, they have no immediate interest in output and it becomes decisive to control them. David Noble – as we have seen – has provided an empirical

confirmation of this claim: machine design and factory organisation are shaped by capitalist interests and managers' obsession for control. The control of workers constituted the cultural horizon of all industrial societies – whether capitalist or sovietic – in so far as they were managed from above. This is why, Feenberg argues, in the eyes of 1960s radical movements: “Modern society was thought to suffer not from economic exploitation but from technical domination” (1999, p. 104). Indeed, critiques of bureaucracy and technocracy were at the forefront, enabling to reject both capitalism and soviet communism. In the back seat, the notion of exploitation was still present and made compatible with a simultaneous rejection of both models using the concept of state capitalism: the soviet state was considered as a monopoly capitalist exploiting workers nation-wide. Castoriadis for instance described the western model as “fragmented bureaucratic capitalism” and the soviet one as “total bureaucratic capitalism” (Chaulieu 1949)¹⁸. Anyway, as Feenberg rightly insists, the New Left's analysis went further than a critique of exploitation based on private ownership of the means of production, as it extended to the technical structure of these means (machines and organisational methods) and to the orientation of production (critique of consumerism). It went well beyond a distinction between market and plan, to focus on the opposition between bureaucratic societies managed from the top and the ambition of self-management from the bottom-up, between “societies in which power rests on the technical mediation of social activities and those that democratize technical control and, correspondingly, technological design”¹⁹ (Feenberg 1992). Moreover, the capitalist horizon unsurprisingly focuses technological development towards the goal of profit regardless of social and environmental consequences. While pre-capitalist landowners had multiple social responsibilities towards local communities, capitalist property stripped away all these obligations to replace them with profit-maximization: “Indifference to nature and human beings shaped modern technology. [...] Narrow specializations and narrow economic goals complemented each other” (Feenberg 2017, p. 55).

In the introduction, I have defined technocratic discourses as those that claim that political decision-making can be reduced to technical expertise and that political power should thus be exerted by technical experts. Therefore, the term “technocracy” can refer to the thesis promoted by such discourses or to the administrations (be they public or private) that they legitimate. Technocracy in this latter sense can be defined as “a wide-ranging administrative system that is *legitimated* by reference to scientific expertise rather than tradition, law, or the will of the people” (Feenberg 1999, p. 4). I further agree with Feenberg that “what makes a society more or less ‘technocratic’ is largely its rhetoric rather than its practice” (1999, p. 4). Indeed, the power of technocracies may be as well supported by pseudo-scientific jargon and dubious quantifications than by scientific studies meeting the highest epistemic standards – for instance, it is often claimed on the left that the economic justifications of neoliberal policies belong to the former category (Généreux 2016). Democratic rationalizations consist in public interventions in the technical sphere which generally undermine or confront technocratic power structures. Individuals in modern societies are enrolled in technical networks that constitute them in social groups: truck drivers, nurses in hospitals, consumers of a specific medicine,

¹⁸ Pierre Chaulieu was one of the nicknames used by Castoriadis.

¹⁹ Self-management however only concerns the sphere of production, while technical mediation also exists in other social domains (e.g., medicine).

victims of specific pollutions, etc. As participants of a network, they are involved in power relations, tend to develop a situated knowledge and usually have collective interests that can become politically salient when their members recognize them. Truck drivers have an interest in well-maintained roads, victims of air pollution an interest in clean air, prisoners an interest in less oppressive architectural design and so on. According to Feenberg, the labour movement can be understood as one of the first instance of such technopolitical struggles: it called for health and safety regulations in factories and, more generally, for democratic ownership and control over the industrial system.

To analyse power relations within technical networks, Feenberg borrows the concepts of strategy and tactics developed by Michel de Certeau. De Certeau compares society to a game: a game defines the players' range of action without determining their moves. Feenberg considers that this metaphor suits even better technology which sets up a framework of permitted and forbidden moves where the rules are systematically biased in favour of dominant players. Strategies belong to administrative powers trying to reach out towards the (natural or social) world to manipulate it from outside according to their will; while tactics consist in the resistance of the subjugated actors caught in the nets of these powers:

“I call strategy the calculation (or manipulation) of the balance of forces which becomes possible once a subject of will and power (a firm, an army, a city, a scientific institution) is isolatable. Strategy presupposes a place that can be circumscribed as one's own and that can serve as the base from which to direct relations with an exteriority consisting of targets or threats (clients, competitors, enemies, the countryside around the town, research goals and objects, etc.) ... One might call this a Cartesian gesture: circumscribing one's own in a world bewitched by the invisible powers of the Other. [It is] the gesture of scientific, political and military modernity” (de Certeau 1980, p. 85, quoted in Feenberg 1999, p. 113).

Subjugated groups lack an organizational base, they evolve in the “exterior” and attempt to react tactically to subvert a strategy from within its framework. Democratic rationalizations represent tactical struggles that have successfully subverted the strategic framework imposed by technocracies and thus reduced its domination.

Technopolitical struggles result into a stable design code which translates social choices in technical terms. The worldviews and interests expressed in vernacular language by social actors are translated into technical language to form design codes which will shape technical artefacts and disciplines. For example, the social demand of disabled groups for wheelchair-accessible sidewalks was translated into a specific slope. Consequently, the opposition between facts and values is often misleading. In so far as values constantly shape the material world, Feenberg affirms that: “values are the facts of the future” (2017, p. 8). However, the values expressed in public interventions can only enter technology if experts are able to reformulate them in technical terms. According to Feenberg, reason and experience – the technical knowledge of experts and the situated knowledge of lays – are both different and complementary:

“Neither expert nor lay actors have a monopoly on rationality. Rationality is distributed across the lines dividing expert from lay and facts from values. The point is

not that these lines are unreal. They are eminently real: without them, no modernity. But they are porous and allow translations in practice for which there is so far no adequate theory” (Feenberg 2017, p. 134).

Denying the existence of these demarcation lines leads to a sterile postmodern relativism, while recognizing their porosity is necessary to understand and support democratic interventions in the technical sphere. Experts usually decry public interventions in their field as purely irrational without understanding how their own disciplines were historically shaped by similar struggles. Once values are translated in technical language and incorporated in a stable design code, experts generally tend to forget the origins of the code and assume it is the product of objective inquiry.

Democratic rationalizations often occur *a posteriori*, after the release of a technology in the public world. Countless examples of controversies over pollution or medical treatments exist, often leading to a change of regulations, designs or practices. These interventions contradict the common view that lay mobilisation systematically limits innovation while technocracy would accelerate it. Indeed, technocratic institutions often monopolize information about environmental and health risks related to technology, in order to avoid spending resources to develop some desperately needed new designs. A second mode of intervention consists in the creative appropriation of technology by their users, in *hacking* them so that they can meet social demands that were not anticipated by the engineers who designed them. The importance of these interventions in the history of digital technology is tremendous and the next chapters will largely discuss them²⁰. A third mode of intervention involves public participation prior to the release of a technology: citizen juries, hybrid forums, participatory research etc. The advantage of this mode is that it attempts to institutionalize technical democracy and surpass the dialectics of domination and resistance between strategy and tactics. Indeed, while the two first modes represent a form of insurgent technical democracy consisting of unceasing struggles against domination, the third one aims to create democratic institutions that structurally abolish technical domination. However, in the context of a society as harshly and structurally based on political and economic inequalities as ours, there are good reasons to believe that such micro-forums of technical democracy will mostly consist in operations of public relations developed by dominant actors to legitimate controversial innovations. The inclusion of protesters in such controlled and institutionalized arenas may sometimes be a strategic move to neutralize their voice and “manufacture consent” (Aguiton 2015).

Moreover, Andrew Feenberg criticizes the economic discourse on trade-offs which often informs policymaking about technology. The trade-off model proposes dilemmas: environmentally-sound technology vs. prosperity, workers’ control vs. productivity etc. The costs of improved designs are estimated in terms of inflation or unemployment, suggesting a trade-off between prosperity and a wide range of social values. Feenberg claims that, while economic exchange is about trade-offs (more of A means less of B), technological development responds to a very different logic of “concretization” (a concept borrowed to Gilbert Simondon): it is able to progressively integrate and synthesize a multiplicity of social demands in the design of an artefact or system without necessarily sacrificing efficiency. Generally, when

²⁰ See especially: Chapter 2, “Practices and Values of Free and Open Source Software”.

the social groups excluded from the original design network mobilize politically to make their interests recognized, they appear as purely ideological to the insiders whose interest are adequately represented in existing designs. Feenberg (1999, p. 95) takes the example of the first technology on which safety regulations were imposed in the United States in 1852: steamboat boilers. Between 1816 and 1852, over 5000 people were killed or injured in steamboat boiler explosions. Despite these accidents, an increasing number of consumers travelled on steamboats. Shipowners took this as a vote of confidence from the public²¹ and protested against the excessive costs of safer designs. A new regulation was finally passed to impose technical improvements which drastically reduced the number of accidents. Such improvements were not technically determined. They depended on a social judgement which could have been made on market grounds (as the shipowners demanded) or politically (as it finally turned out). This social judgement changed the definition of a boiler, its design code: “Raising the standards means altering the definition of the object, not paying a price for an alternative good or value as the trade-off model holds” (1999, p. 96). Once the boiler code is fixed, its different parts get integrated and function as a consistent whole. It then becomes impossible to decompose that whole to identify the specific price of safety. As technical advances follow on the base of this new design code, movement backward no longer seems technically feasible. Thus, we may conclude with Feenberg:

“Design is only controversial while it is in flux. Resolved conflicts over technology are quickly forgotten” (1999, p. 97).

²¹ This example also illustrates the colossal flaws of a widespread discourse claiming that ethical consumption would be a sufficient means to promote social change.

Impure Reason

Andrew Feenberg is a relentless critique of essentialist philosophies of technology. Constructivist STS have shown the profound influence of socio-historical factors on every technological realization, rendering the notion of an unhistorical and extra-social essence of technology very dubious. However, essentialist thinkers did point out important features of technological rationality and dissolving the concept of technology in the multiplicity of its empirical manifestations may hinder philosophical reflection on modernity and technology. The solution proposed by Feenberg – which I find convincing – consists in a historical concept of technology’s essence which combines the philosophical and sociological perspectives. This solution is largely inspired by Marcuse (1965). The latter acknowledged that technical principles can be formulated in abstraction from any interest or ideology. However, as such they remain mere abstractions: as soon as they enter reality, they must take on a socio-historically situated form flooded with interests and ideologies. Efficiency for instance, can be formally defined as a ratio of inputs to outputs. This definition would apply as well in a capitalist as in a communist or a primitive society. But when one concretely implements the notion of efficiency, he must precise what counts as possible inputs and outputs, who can offer and acquire them and on what terms, what counts as waste and hazards etc. Technical principles must be practically contextualized to be used at all, and “this is not merely a matter of classifying particular social contents under universal forms, but involves the very definition of those forms which, as soon as they are contextualized in a capitalist society, incorporate capitalist values” (Feenberg 1996).

An essentialist philosopher such as Habermas, may respond that this does not matter at a theoretical level: principles, whether they are ethical, political, economic or technical, always acquire a particular form when they are practically implemented. The fact that the abstract principle slightly differs from its empirical realisations does not mean that we cannot formulate it in a purified ideal type. But this understanding of the relation of principle to application is problematic in the case of technology. Indeed, ethical principles provide a solid standpoint to judge their application, whereas judging technical realisations based on technical principles alone, tends to mask and legitimate their social and ideological biases:

“For example, if one invokes the principle of fairness selectively to perpetuate discrimination, as in the current attack on affirmative action, that is itself unfair. By contrast, technical changes introduced in the workplace to enhance managerial power may be justified by reference to efficiency, in the sense that they may increase the return on capital even as they render the job more difficult and painful. The moral dimension of this outcome is occluded rather than revealed by the application of technical norms” (Feenberg 1996).

Feenberg thus proposes a two-level theory of the essence of technology: primary instrumentalization consists in the functional constitution of technical subjects and objects²², and secondary instrumentalization consists in the realization of these subjects and objects in

²² It is important to keep in mind that, in the context of management, human workers are constituted as technical objects.

concrete devices and systems. Primary instrumentalization corresponds to the features identified by essentialist philosophers that characterize technology in every society (though they may differ in emphasis, range of application and significance), while secondary instrumentalization explains the variety of technological realizations. This understanding of the profound social embeddedness of technological rationality differs from the one of Marcuse and other New Left thinkers in one respect. While the latter directed their critique at the epochal structure of technological rationality (its capitalist horizon) in the hope that a revolution would create a radically different one, Feenberg's theory not only enables to seize such major transformations, but also minor ones that inspire new designs within a capitalist society.

Primary instrumentalization is composed of four essential moments (1999²³): the two first (decontextualization and reduction) are inspired by Heidegger, while the two second (autonomization and positioning) are inspired by Habermas.

- Decontextualization: to constitute natural objects as technical objects, they must be “de-worlded”, that is artificially separated from their original context to be integrated to a technical system. The isolation of the object facilitates its utilitarian evaluation: the tree conceived as lumber is encountered through its usefulness and abstracted from its manifold interconnections with its initial environment.
- Reduction: this is the process in which de-worlded things are simplified, stripped of technically useless qualities and reduced to the qualities perceived as essential by a technical subject to achieve its goals.
- Autonomization²⁴: The technical subject isolates itself as much as possible from the effects of its action on its objects. Metaphorically speaking, technical action attempts to violate Newton's third law which states that, “for every action there is an equal and opposite reaction”. This law approximates well social relations: anger is likely to evoke anger, kindness to elicit kindness etc. On the contrary, tools are made to focus power outward while preserving the tool-user from the Newtonian reaction: the hunter only feels a slight pressure on his shoulder when he shoots a rabbit. However, autonomization is somehow illusory: it blinds us from our deep connection to the world which implies that the Newtonian reaction will eventually be felt. Powerful technologies focusing considerable forces on the outside world eventually provoke vast unintended consequences.

²³ I am presenting here the instrumentalization theory developed by Feenberg in “*Questioning Technology*”. He added new elements to this theory in “*Technosystem: the social life of reason*”, but his older and simpler theory is largely enough to illustrate his understanding of technology's essence – which is what I am concerned with here.

²⁴ The idea that focusing power outward is a universal character of technology belonging to primary instrumentalization, rather than a cultural realisation of technological rationality belonging to secondary instrumentalization, may however be questioned. I accept it here as a good approximation of technological rationality, but this could be a ground for further research. Indeed, a stimulating text written by Ursula Le Guin (1986) argues that “with or before the tool that forces energy outward, we made the tool that brings energy home”. The basket would be a paradigmatic example of such tool. The tool focusing power outward, exemplified by knives, axes and weapons in general, would be central to dominant representations of technology because of a patriarchal bias (the knife is a phallic symbol). However, tools made to carry, contain, unite or transport have had a crucial role in the history of civilisation Ursula Le Guin argues. We may remark, to go in her direction, that the mythical horn of plenty (cornucopia) is indeed a basket.

- Positioning: Technical action controls its objects by following its laws. As Francis Bacon (1939) once put it: “Nature to be commanded must be obeyed”. The combustion laws rule over the automobile’s engine as the laws of the market rule over the investor. The technical subject must accept the laws and position himself strategically to use them to his advantage.

Secondary instrumentalization re-contextualizes the abstract aspects of technological rationality in the social world, associates it with interests and values to give a full consistency to its underdetermined nature.

- Systematization: Decontextualized technical objects must be combined with each other and re-embedded in a new sociotechnical environment. Wheels can be combined with a handle and a container to constitute a wheelbarrow. Similarly, large technical systems require such processes of connection.
- Mediation: The constitution of a technical object requires its integration to a new cultural system from which it receives specific ethical and aesthetic standards.
- Vocation: One of the ways in which Newton’s third law applies to the technical subject, is that his repeated actions eventually define his identity. One becomes a hunter by shooting rabbits with a rifle. The use of tools thus has a certain feedback on their users.
- Initiative: The object of technical manipulation may be a subject capable of initiative. The strategic control of the worker through positioning is to some extent limited by his tactical resistance. Similarly, the user of a tool is constrained by the tool’s design: here, initiative lies in the range of possibilities allowed by the existing design, but it may as well inspire new designs.

Technosystem

Modern societies are structured by rationally designed technical artefacts and institutions informed by rational technical disciplines. The works of Andrew Feenberg have essentially focused on technologies and technical systems, but markets and administrations regularly came up in his analysis. Indeed, modern technical systems are inextricably linked with markets and administrations, and the distinction between the former and the latter sometimes seems more analytical than empirical. In one of his latest books, Feenberg developed the notion of technosystem to simultaneously address technology and rational institutions. He defined the technosystem as “the field of technically rational disciplines and operations associated with markets, administrations, and technologies” (2017, x). The modern notion of rationality is based on the model of mathematics and experimental sciences. Modern rational institutions are composed of causal and symbolic relations and cannot reach the rigor of these disciplines. Yet, they are based on rational procedures and principles that tend to mirror these disciplines and reify social interactions – to subject them to causal laws resembling the ones that govern natural phenomena. Feenberg identifies three general rational principles that structure modern societies. Markets are based on the exchange of equivalents which also underlies mathematical reasoning. Administrations resemble science as they classify cases and treat them under universal rules. Technologies (and business) are based on the adjustment of means to ends, or in other words, on the search for efficiency.

Moreover, Feenberg’s theory of technological rationality applies with some modifications to the other forms of instrumental rationality ruling markets and administrations. Commodification implies a primary instrumentalization based on four principles: alienability, excludability, rivalry, and standardization. Alienability also decontextualizes an object from its original environment to make it suitable for exchange. Excludability and rivalry delimit the boundaries of private property and ensure the scarcity of a good, which is a crucial determinant of its market price. Standardization simplifies an object by removing concrete differentiating features. Commodification also contains a moment of secondary instrumentalization. Aesthetic and ethical mediations influence the design of commodities as the one of technologies. Commodities also tend to have a feedback on their owners’ identity. And ownership may open margins for initiatives that can affect the commodity, its production, use and design. Similarly, administrative power implies a form of primary and secondary instrumentalization. First, administrations decontextualize and reduce the complexity of cases to well-defined categories, while their power over their administered or subordinates easily illustrates their autonomization. Second, cases are recontextualized in a framework defined by cultural meanings which may as well imply ethical or aesthetic mediations (e.g., zoning regulation); administrative action feedbacks on administrators’ identities; and tactical initiative of the administered or subordinates always remain possible.

Modernity is also characterized by a drive towards globalization in the sense of increasing interactions and interconnections between individuals and communities at a global scale – stimulating the advent of what Friedrich Hayek called the “extended order of human cooperation” (1988). This is because markets, administrations, and many modern technologies are coordination media: they have supported an extensive process of division and specialization

of labour and technical knowledge among individuals and groups that are disseminated around the globe, by allowing their coordination. Habermas (1984) developed an influential theory of coordination media which ignored technology and focused on administrations (or power) and markets (or money). Media-steered interaction is an alternative to communicative understanding, to arriving at shared beliefs through linguistically mediated exchanges. Instead, media de-linguistify social interaction through reifying mechanisms that enable individuals to coordinate their behaviour while pursuing individual success in an instrumental attitude toward the world. In media-related interaction, shared beliefs and values play a marginal role, communication merely consists in simplified codes and stereotyped utterances aiming at successful performance. The coordination of actors does not result from their conscious intention but from the structure of the medium. Habermas' theory is thus based on the duality between system (media-related interactions) and lifeworld (communicative action aimed at mutual understanding). To him, the essential problem of modernity is the colonization of lifeworld by the system. Consequently, he aims to find a balance between these two forms of rational coordination, based on two essentially different forms of rationality: instrumental and communicative rationality.

André Gorz (1988) has proposed an analysis rather close to (and inspired by) Habermas, but slightly more critical of the heteronomous character of media coordination. The duality between lifeworld and system is re-conceptualised as a duality between a sphere of autonomy and a sphere of heteronomy. The former is based on self-regulation which "refers to the ability of individuals to self-organize by coordinating their conduct with a view to obtaining a result by their collective action", whereas the latter is based on hetero-regulation, in which "individual actions are not coordinated through collective agreement but based on functional interconnections, in a way that does not correspond to any of the actors' intentions and which is most of the time not even perceived by them" (p. 62). Gorz then defines functionality as "a type of rationality which comes from the outside to the conduct determined and specified for the agent by the organization in which she or he is subsumed" (p. 59). Media coordination and its corresponding instrumental rationality are considered legitimate within certain boundaries by Habermas. For Gorz, they constitute a sphere of heteronomy, which is necessary for the moment but should be progressively reduced or even – if possible – abolished. Administration consists in planned hetero-regulation, while the market consists in spontaneous hetero-regulation: "it imposes its rules from outside to individuals who are then ruled by them and forced to adapt and modify their conduct and projects according to an external, statistical and totally involuntary balance of forces" (p. 62).

Andrew Feenberg addresses two main criticisms to Habermas: he largely ignores technology and his essentialist concept of instrumental rationality makes him unable to understand formal biases. To address the first drawback, Feenberg proposes to reformulate the media theory by considering technology as a third coordination medium (1996). A possible objection to such endeavour is that technology involves causal relations to nature while the other media are more social: market and administration simplify human communication, whereas technology would not have a communicative content. But in fact – Feenberg claims – technology also has a communicative content: automobiles and clothes communicate the status of their owners; locks communicate legal obligations; computer programs communicate their

designers' understanding of a problem etc. More importantly, technologies are essential for large-scale coordination: workers in a well-designed factory find their tasks meshing because of the structure of the equipment, and more generally, large-scale social cooperation could not function without timing, communication, or transportation technologies. Another possible objection to Feenberg is that technology should be understood as a mediator through which administrations and markets penetrate the lifeworld more than as a full-fledged medium: technologizing a domain of life opens it to economic or political control. But Feenberg objects that all media are intertwined empirically, while it is only analytically that they are clearly distinct: money for instance is a means to power and vice-versa. The authority of those in charge of designing technical systems and devices is not exactly similar to political or economic power, it is *sui generis* Feenberg argues. Technology generates what Latour (1992) called "prescriptions" (the alarm in his car forced him to fasten his seatbelt) and complying with the prescriptions of a machine is different from obeying political commands or accepting an exchange of equivalents on the market.

The second critique addressed to Habermas concerns his inability to theorize the possibilities of change within the technosystem, the opportunities of democratic rationalizations. Not only technologies, but also administrations and markets have biases that materialize interests and values. Feenberg speaks of formal bias, as opposed to substantive bias. The Enlightenment philosophy aimed to denounce substantive biases such as prejudices, emotions and pseudo-facts influencing judgements that ought to be based on rational standards. It is mostly inadequate to address modern forms of domination which are generally based on formal biases, that is, on discriminatory principles which are objectified in rational institutions and artefacts and can only be revealed by a socio-historical analysis. Feenberg sees in Marx's theory of surplus-value one of the earliest critiques of such formal bias. While Proudhon considered property to be theft (1840) and unions demanded "fair" wages, Marx agreed with bourgeois economists who claimed that every commodity, including labour, is sold at its value. But the exchange value of labour power – determined by the amount of labour required to produce the goods necessary to the worker's subsistence – is lower than the amount of value it can produce as it is used by capital for a given time. The difference constitutes surplus value. The rational functioning of the capitalist market thus enforces social domination and exploitation²⁵.

Feenberg is not aiming to defend the Marxist theory of value and exploitation – on the contrary he seems to find it outdated – but only to promote its form of reasoning, which allows for a critique of formal bias. Similarly, a culturally biased test which is fairly administered will still have discriminatory outcomes. Here, the bias does not come in the form of ordinary prejudices in the mind of the testers. It is a property of the test itself in its social context: it favours the culture of a community at the expense of others. Formal bias consists in the materialization of ideologies and interests in the design code of technologies (and technical disciplines), markets and administrations. In the case of administrations, design regards the forms of organizational structure and operating rules; while in the case of markets, it regards forms of property rights, marketing, regulations, zoning, subsidies etc. As they are integrated to the design code of

²⁵ Another interesting example would have been Marx's critique of the formalism of human rights (1844), which in substance, in the concrete conditions of modern societies, only apply (he argues) to bourgeois and not to all men. Marx especially had in mind the rights to property and to safety.

technologies and rational institutions, these interests and ideologies penetrate their rationality and become immune to the traditional critique of the irrationality of substantive bias. Nonetheless, they can be transformed through democratic rationalizations.

Thus, Feenberg envisions both a (Habermas' inspired) strategy of *external* limitations to the colonization of lifeworld by the technosystem and a (more Marcusean) strategy of *internal* struggles over the design of the technosystem – though he mostly insists on the latter, especially in his most recent works.

What should we think about Feenberg's philosophy and approach to emancipation? There is no doubt that the concept of democratic rationalization is interesting in that it gives a serious rationale to support struggles against technocracies. However, its scope and ambition seems to have been reduced over the years from a strong argument in favour of self-management to a theory of multiple specific struggles over the technosystem, of a "technical micropolitics" as Feenberg himself calls it (1999, p. 120). If his technical micropolitics is much more alert to relations of power and domination than the one of Bruno Latour (as it includes macro-sociological concepts) it somehow reproduces its main flaw. That is, it tends to dissolve in a multiplicity of specific and limited struggles the central conflict between labour and capital, and to lose sight of what should give them their essential meaning and direction: the socialist ambition to democratize the economic sphere.

It is indeed crucial to understand how to articulate a two-fold strategy of, on the one hand external limitations to the colonization of lifeworld by the technosystem, and on the other hand, internal struggles over the design of the technosystem. However, it is completely illusory to think that significant successes on any of these two fronts can be reached without a radical confrontation with and even a form of surpassing of capitalism. Technosystem cannot but expand continuously and colonize lifeworld under capitalism: the engine of technosystem expansion is economic growth²⁶ which is implied by capital's logic of unlimited accumulation. I believe that Ellul was wrong on that point: it is not a logic of autonomous technological development which determines the expansion of the technosystem, but fundamentally an economic logic of capital accumulation (money in search of more money). The historical context in which Ellul wrote may explain his views: the west European post-1945 configuration, in which state-led research and development was essential to economic growth. Surprisingly, Feenberg never formulates any criticism of economic growth and even associates it with "prosperity" – an association that has been highly contested by many authors, including Tim Jackson in his already classic "*Prosperity without growth*" (2009). He even used his concepts of democratic rationalization and concretization to support the cornucopian claim that economic growth could be absolutely decoupled from environmental degradation through technological progress²⁷ (1999, chapter 3). Such absolute decoupling has never been empirically observed

²⁶ By "economic growth", I mean "GDP growth".

²⁷ Against the ecologist claim that infinite economic growth is impossible on a finite planet, cornucopians promote the idea of decoupling: economic growth could be decoupled from the growth of environmental destruction. Decoupling can be relative or absolute. Relative decoupling means that economic growth becomes more resource efficient, that for one unit of GDP produced, less resource consumption and waste production are needed. However, economic growth can only become sustainable through absolute decoupling: a decline in absolute terms of resource use and waste production despite a continuous increase in GDP.

and most studies suggest it is highly unlikely to ever occur (Hickel et Kallis 2020). Thus, although I largely follow Andrew Feenberg on the debates (A) and (B), regarding the issues of techno-determinism and technocracy; I consider his techno-philia slightly excessive and problematic for vital environmental reasons. Furthermore, without a critique of economic growth, it appears that Feenberg mainly proposes internal struggles over the design of the technosystem. As he focuses on this front, he does not seek any grand resolution of social conflict nor revolution, but specific struggles bringing limited progresses that may add-up overtime. The ideal of self-management and libertarian socialism is not completely abandoned but appear increasingly distant while the focus is clearly put on micropolitics. Here as well, I consider that without a radical confrontation with and surpassing of capitalism, the design of the technosystem is destined to remain systematically biased towards the aim of profit (regardless of any social and ecological cost) and the complementary aims of control, domination and exploitation. Most technopolitical struggles actually consist in immense and mostly unsuccessful efforts by dominated groups to mitigate problems that would never have arisen in the first place if workers, consumers, and groups impacted by a production process had a say on it (its means and its ends), rather than only profit-seeking capitalists and control-seeking managers. It is true that some domains of technical domination are not soluble in the issue of capitalism (e.g., medicine, education). Still, they are clearly reinforced and tainted by capitalist imperatives of profit and control.

To define an emancipatory path articulating both internal struggles over the design of the technosystem and external limitations to it, it is necessary to question the extent to which the heteronomous character of technology and rational institutions is a matter of design or is rooted in their essence (or primary instrumentalization). We can agree with Feenberg that: “Simply put, sometimes technology is overextended, sometimes it is politically biased²⁸, sometimes it is both” (1996). Some limits must be put to the artificialisation and technical manipulation of nature. Nonetheless, technology is a defining feature of mankind and trying to escape from it is absurd. Technological design is thus a crucial issue. What sort of technologies should an emancipatory political project be founded upon? Unfortunately, Feenberg rarely discusses that fundamental question. We could also say that markets are sometimes biased, sometimes overextended, and sometimes both. The existence of markets of goods and services is not problematic in itself – they constitute an institution that usefully supports the coordination of specialized labours within a complex society. An economy with such markets is not necessarily capitalist. Capitalism is founded upon the private property of the means of production, which separate workers from these means and the products of their labour, thus enabling their relentless exploitation by capital seeking profit-maximization. Capitalism implies the commodification of labour, and as Polanyi (1944) would rightly add, the one of land and money. The infinite logic of capital accumulation entails the constant expansion of the sphere of market exchange and the progressive commodification of nearly all that escapes to it, which represents a dangerous overextension of markets. Thus, commodity markets must be reduced in scope (this amounts to economic degrowth) and re-designed in order to be exorcised from their

²⁸ This does not mean that we should strive for technologies that are not politically biased. This is impossible – and Feenberg writes it elsewhere – as they necessarily incorporate values and interests. Only, they should be politically biased towards democratically formulated values.

capitalist features. What about administrations and bureaucracies? The two concepts are very close but I introduce a significant distinction between them. An administration can be defined as a formal organisation which operates according to rules, functions on a stable basis and employs professionals with diversified skills. A bureaucracy is an administration functioning on a strictly hierarchical basis. The vast majority of administrations are bureaucracies, which explains their quasi-synonymy in many discourses; but some administrations function on a much more democratic basis (e.g., cooperatives, some associations, some educational institutions) and self-management can be conceived as self-administration. Nevertheless, even purely self-managed administrations²⁹ may be overextended if they end up administrating and controlling activities and domains that should be left to individuals, more informal groups (e.g., families, friends) or even non-humans (e.g., animals, insects, micro-organisms).

Therefore, it appears that regarding all three elements composing the technosystem, an emancipatory perspective must aim to radically transform their design and put external limits to their potential overextension.

²⁹ Here the collective referred to by the “self” may include not only the workers of the administration but also their administered in the case of a public administration, or customers and other relevant groups in the case of a private administration.

Autonomy

Castoriadis and the imaginary institution of society

Castoriadis's social ontology and his political theory are strongly linked. It is not necessary to adopt his social ontology to practically support a conception of autonomy and emancipation that is similar (or very close) to the one formulated by his political theory³⁰. Still, I choose to adopt his social ontology. Not only because I find it appealing, convincing and took the metaphysical (thus arbitrary and irrefutable) decision to think in those terms; but also, because I believe it gives additional arguments for and a better perspective on his political conception of autonomy.

Castoriadis condemns "inherited thought" (all pre-existing philosophies) as a whole for its inability to properly grasp the particular mode of being of society. The latter he argues, cannot be conceived in deterministic terms as it consists in a permanent self-alteration, a creative process of self-institution that is not caused but originates from imagination. Inherited thought has never been able to seize the question of the mode of being of society and history and to consider it for itself:

"This object has almost always been split into a society, related to something other than itself and, generally, to a norm, end, or telos grounded in something else, and a history, considered as something that happens to this society, as a disturbance in relation to a given norm or as an organic or dialectical development towards this norm, end, or telos" (1975, p. 251).

Reflections about history and society have always been formulated within the limits of the inherited logic-ontology which understands being as determinacy, and thus, excludes the recognition of a type of being that essentially escapes determinacy. All traditional answers to the question of society and history can be reduced to two main types. The first is the "physicalist type, which reduces, directly or indirectly, immediately or in the final analysis, society and history to nature" (1975, p. 255). Functionalism is a paradigmatic example of this type: it attempts to explain every social institution and its characteristics by its functionality, that is, its ability to satisfy fixed human needs. Since human needs are not fixed and natural but socio-historically instituted, functionalism collapses on its supposed foundations. The second type is the logicist one. Castoriadis argues that its poorest form is exemplified by the structuralism of Claude Lévi-Strauss, which holds that all human societies can be reduced to different possible combinations of a finite number of the same discrete elements. Hegelianism or Marxism would represent its richest forms: the logic in question here involves all material and spiritual figures of the universe and put them into deterministic relations within a complete system that is ultimately moved by an element which can indifferently be Reason or Matter. These traditional answers do not respond to the question of history – which is the one of the emergence of absolute novelty – but rather suppress it. Physicalism understands history through causation,

³⁰ For instance, it is conceivable to support Castoriadis' political project of direct democracy in both the political and economic sphere based on a Spinozist social ontology. To put it in Rawlsian terms: despite divergent comprehensive doctrines (social ontologies in that case), there can be an overlapping consensus at the level of a political conception of justice (political theory).

which denies otherness by positing a double identity: an identity in the repetition of the same causes producing the same effects; and an identity between the cause and the effect, since each necessarily belongs to the other, or both to the same whole. And, as it faces history, logicism turns into rationalistic finalism: the organic or dialectical development is necessarily oriented towards an end, which has always and necessarily been fixed as much as its path.

Inherited thought is unable to think the social-historical because it attempts to grasp it with the categories of the ensemblist-identitary (or ensidic) logic. Castoriadis identifies the ensidic logic with the help of Cantor's definition of a set in mathematical theory: "a set is a collection into a whole of definite and separate objects of our intuition or thought. These objects are called the elements of the set". The logical principles of set theory matter here as they exemplify and concentrate in the purest terms what has always been underlying the ensidic logic – which represents an essential and irreducible dimension of all social life and activity. Indeed, any society must be able to consider definite elements, to order them into classes, to attribute them certain properties, and to recognise certain relations between these elements as stable. The richest advancement of the ensidic logic is to be found in the development of mathematics. Yet, any society will have to apply ensidic logic and, for instance, "it is always and absolutely necessary that each and every cow belong to the category 'cow', that it cannot be a bull (or not in just any way) and that it give birth, with practically absolute certainty, to calves. [...] It is always and absolutely necessary that knives cut, that water flows and fire burns" (1975, p. 336). This does not mean that different societies do not slice the social and natural world in radically different ways, but that they will always have to slice them in definite parts, to compose and decompose them and apply basic logical schemata as an essential moment of their own self-institution which conditions all their social representing/making. Society can seize the world through sets (ensembles) because the world is not pure chaos. It is partially structured and thus ensemblizable. However, the social and even the natural world do not consist of a set or a hierarchy of sets. Regarding the natural world, Castoriadis affirms that "the idea of a given, assignable organization of nature (and one that is essentially, that is ontologically, simple) which society could take up part by part or progressively, is simply the incoherent fantasy of a certain stage of Western science" (1975, p. 341). Still, the institution of society leans on a basic natural stratum which has a certain structure and stability. The instituting process does not reproduce, reflect nor is determined by this natural stratum in any manner. Rather, it finds in it "a series of conditions, supports and stimuli, stops and obstacles" (1975, p. 345) with which it cannot play at will.

Society is even less reducible to a set or hierarchy of sets than the natural stratum, since its institution not only deploys through an ensidic dimension but also through an imaginary one.

"History is impossible and inconceivable outside of the productive or creative imagination, outside of what we have called the radical imaginary as this is manifested indissolubly in both historical making and in the constitution, before any explicit rationality, of a universe of significations" (1975, p. 220).

The radical imaginary is the most fundamental instance of the human psyche. It is not limited to the faculty to produce a mental representation of an object in its absence, the faculty of reproduction and re-combination of man's sensitive experiences, as inherited thought has often

suggested. It rather consists in an uncontrolled and incessant flux creating images, forms, and ideas, generating a universe of significations which includes the basic figures and schemata that underlie any form of representation and rational thought. It has an individual dimension (radical imagination) and a social one (social imagination) which are both inextricable and irreducible to one another. The radical imagination of the individual is pervaded and enabled by the social imagination, though it will always resist to its full absorption in the latter.

The radical imaginary is a constant source of absolute creation which explains the surging of otherness in history. Castoriadis considers that a figure B is other than a figure A (and not simply different from it) only if no ensemblist-identitary law or group of laws suffice to produce B from A: “And so I say that the circle is different from the ellipse but that the *Divine Comedy* is *other* than the *Odyssey*, and capitalist society is *other* than feudal society” (1975, p. 291). Against Plato, Castoriadis insists that when a craftsman produces a bronze statue or a wooden table, he does not simply actualize in the material world an eternal form (*eidos*). On the contrary, he creates the form itself, the *eidos* of the statue or table. If the craftsman only printed an eternal form to his material, he would only be a producer. But he does create the *eidos*. Consistently with this point, Castoriadis reckons that “the wheel revolving around an axis is an absolute ontological creation” (1975, 294). In addition, such *poiesis* (creation) is not limited to *technè* or the fine arts but is found everywhere in the institution of society: history, the self-alteration and self-institution of society across time is a creative process. Still, if social-historical creation is “unmotivated – *ex nihilo* – it always occur under constraints (it does not make itself *in nihilo* or *cum nihilo*)”. In other terms: “in the social-historical domain as everywhere else, creation does not mean that anything can happen anywhere, anytime and in any manner” (1997, p. 20). Yet, I agree with Pierre Dardot and Christian Laval when they argue that the expression “*ex nihilo*” (based on nothing) is confusing and inappropriate as it may give the impression that creation is unconstrained and uninfluenced by what exists. Instead, they propose to describe social-historical creation as “*ex aliquo*” (based on something) but “*sine causa*” (uncaused), which is perfectly consistent with Castoriadis’s philosophy (2015, p. 389-390).

Social imagination has two dimensions whose union and tension underlie the dynamism of the social-historical: the *instituting* social imaginary is the process through which the anonymous collective creates new significations, while the *instituted* social imaginary is the currently existing product of this process. That is, all the currently existing social institutions. Castoriadis uses the notion of “social institutions” in a very broad sense, corresponding to all that has been instituted by society, which includes for example languages, norms, technologies, relations of production, laws, religions etc. An institution is “a socially sanctioned, symbolic network in which a functional and an imaginary component are combined in variable proportions and relations” (1975, p. 197). Social institutions thus have a functional (or more generally, an ensidic) and an imaginary component. They are also manifested and sanctioned as a symbolic network. The term “symbolic” refers to the relation between a signification and its supports (signs, words, images, figures). Moreover, institutions are structured by “social imaginary significations” (SIS). The fact that they are imaginary does not mean that they are unreal or fictitious. It only means that they are not derived from reality, nor result from rational thinking or functional considerations, but arise from social imagination. SIS constitute the specific way through which a society answers fundamental questions concerning its identity,

values, desires, vision of and relation to the world etc. so as to institute itself as a consistent whole, distinct from all *other* societies, and holding together the wide diversity of its components.

It is only metaphorically that Castoriadis speaks of “questions” and “answers” here: “These are not questions and answers that are posed explicitly, and the definitions are not ones given in language. [...] Society constitutes itself by producing a *de facto* answer to these questions in its life, in its activity” (1975, p. 221). Therefore, it would be abusive to reduce Castoriadis’s philosophy to a form of idealism. Rather, it represents one of the solutions proposed to overcome the problematic privilege given by Marxism to material determinations and its rigid antinomy between the material and the ideal³¹. Indeed, Castoriadis agrees with Marx that a society reveals itself first of all in its effective life and activity (especially labour). However, what this activity reveals is a meaning which is not given by nature but instituted by social imagination: “human labour [...] indicates in all of its aspects, in its objects, in its ends, in its modalities, in its instruments, a specific manner of grasping the world” (1975, p. 222). In this respect, it is important to radically distinguish Castoriadis from the naïve idealism professed by some figures of today’s mainstream/moderate environmentalism (at least in the French public debate) such as Cyril Dion or Pierre Rabhi who often refer to “imaginaries” and “narratives”. While the latter encourages a very apolitical, spiritual and individual change of consciousness which would suffice to change the world by encouraging the modern man to reconnect with nature; the former suggests that, since narratives sustain social orders, we simply need to promote different narratives to get a gentle transition to a fairer society (Chédin 2018; Malet 2018). On the contrary, Castoriadis affirms that social imaginary significations inform and structure social institutions as they get embodied into social practices, political actions and material structures. Never did he meant that a vague cultural change could reconcile social classes and lead to just institutions through a gentle transition. To the contrary, he spent his life actively promoting a social revolution which would simultaneously abolish the State and capitalism. Serge Latouche, a central figure of degrowth which has been strongly influenced by Castoriadis, might have (unwillingly) played a role in the trend towards the neutralization of the subversive content of the notion of imagination, by suggesting that we should change our values and modes of life as a prelude to more macro-political transformations: “The realisation of any alternative political project requires a mental revolution more than the conquest of political power” (Jouventin et Latouche 2019).

If the social-historical cannot be reduced to a set or hierarchy of sets, it is because the SIS structuring it are not definite and distinct but indefinitely linked to each other through a mode of relation called the “referral” (*renvoi*). The signification “priest” for instance, refers me to the signification “religion”, which refers me to “god” as well as to the world as his creation and to countless other things. Thus, the social-historical and the radical imaginary can only be understood as a magma or a magma of magmas, if we define this concept as follows: “A magma is that from which one can extract (or in which one can construct) an indefinite number of

³¹ Many philosophical approaches attempted to overcome this problem of Marxism: Gramsci’s concept of hegemony, different spinozist approaches such as the one of Frédéric Lordon, or the personalism of Bernard Charbonneau (constantly obsessed with the objective to re-unify the body with the spirit) represent a few examples.

ensemblist organizations but which can never be reconstituted (ideally) by a (finite or infinite) ensemblist composition of these organizations” (1975, p. 497). Consequently, the different domains of social life (e.g., economy, law, politics, technology, ideology) are not fixed, separate and connected through stable relations but coexist within the magma. And the instituting social imaginary alters and redeploys these different spheres and their mode of coexistence throughout history. As we have seen, the modern mode of coexistence between social spheres – which has extensively furthered their differentiation – does not reveal the essence of any of them (the essence of technology for instance), but only a socio-historically situated form of their articulation.

The project of autonomy

Castoriadis conceptualizes alienation and emancipation in terms of heteronomy and autonomy: autonomy means self-legislation (in Greek: “*autos*” = “self”, “*nomos*” = “law”), while heteronomy refers to the submission to a legislation coming from an external instance (“*héteros*” = “other”). Every society needs institutions and rules: the ideal of a society which is fully transparent to itself, in which the desires of all would spontaneously converge into a collective will without passing through institutions is an incoherent fiction, a “poor anarcho-Marxist utopia” (Castoriadis 1999, p. 46). Heteronomy appears in the relation of a society to its institutions but it is not this relation itself; in other terms, there can be an autonomous relation between society and its institutions. Institutions may be – and currently are – a factor of heteronomy in their specific content: they express and safeguard the division of society in classes and the domination of one over the other, as well as other forms of social division and domination based on gender or race for instance. At a more fundamental level, heteronomy consists in a specific modality of the relation between a society and its institutions, that is, in the autonomization of institutions from the control of society:

“Once an institution is established it seems to become autonomous, [...] it possesses its own inertia and its own logic, in its continuance and in its effects, it outstrips its function, its 'ends', and its 'reasons for existing'. The apparent plain truths are turned upside-down: what could have been seen 'at the start' as an ensemble of institutions in the service of society becomes a society in the service of institutions” (1975, p. 164).

Heteronomy is rooted in the fact that, although every society creates its institutions, most tend to occult this self-creation and impute it to a source which is extra-social (or at least external to the effective activity of the considered society) such as nature, heroes, ancestors, gods, the laws of history or those of the market. As a result, they live in a closure of the instituted imaginary which inhibits their ability to question and transform their institutions. This conception of heteronomy goes well beyond social domination: stateless and classless primitive societies were perfectly heteronomous in these terms. Paradoxically, the historical emergence of social classes (about six millenaries ago in Mesopotamia) represents a first crack in the closure of the instituted imaginary which opened emancipatory perspectives: with them appeared class struggles and the contestation of the social order. The second and most important crack occurred in ancient Greece.

Castoriadis contends that “until Greece, and outside the Greco-occidental tradition, societies are instituted on the principle of a strict closure: our vision of the world is the only one that make sense and that is true, ‘others’ are strange, inferior, perverse, wrong, dishonest” (1986). Genuine interest for other societies and their institutions was born in ancient Greece, and this interest is only another aspect of the critical distance Greeks had to their own institutions. Greeks recognized that they were at the origins of their institutions and thus that they had the right to discuss their validity. Consequently, they gave birth to both politics – a dynamic of unlimited questioning about justice – and philosophy – a dynamic of unlimited questioning about truth. As we have seen, Castoriadis distinguishes “politics” (*la politique*) from “the political” (*le politique*). The political refers to the dimension of explicit power which exists in

every society (even stateless ones), that is the instituted instance (or instances) capable of issuing sanction-bearing injunctions. On the contrary, “politics” is a rare and fragile socio-historical creation that emerged a first time in ancient Greece and a second in modern western civilisation. It is synonymous to the project of autonomy and consists in the collective, explicit and lucid activity that questions social institutions with the view to render them as just as possible. The project of autonomy represents a movement that has no endpoint; it does not aim for a “perfect society” but for a society that is as free and just as possible.

A couple of complementary remarks should be made to further specify this conception of autonomy. First, it appears clearly that inherited thought contributes to heteronomy. It reduces the mode of being of the social-historical to the deterministic categories of the ensidic logic, while Castoriadis’ social ontology favours autonomy by insisting on the creative dimension of the imaginary institution of society. Castoriadis’ social ontology sheds light on the self-institution of society, the recognition of which underlies autonomy. A second point concerns the classic issue of the universalism or relativism of democratic values. From a Castoriadian perspective, it appears that autonomy has an objective superiority over heteronomy in at least one respect: every society creates its institutions, but autonomous ones acknowledge this fact while heteronomous ones refuse to do so. The difference between these two options is thus morally connoted: on one side is the recognition of a basic truth, while on the other is its ignorance or denial. The fact that – according to Castoriadis – the first germ of autonomy appeared in ancient Greece does not mean that its value and potential is not universal (1999). Third, in a heteronomous society the dominant class is also alienated to its institutions (although in a different way than the dominated class is): “its institutions are not related to it in a purely external and instrumental manner, as naive Marxists sometimes would have it” (1975, p. 171). If power in modern societies is extremely concentrated (Castoriadis rightly calls our political regimes “liberal oligarchies”), the dominant class cannot manipulate institutions at will in just any manner for a variety of reasons: it is mystified by its own ideology, faces institutions that have a certain inertia, operates within a complex technosystem, is subdivided into multiple competing groups etc. Conspiracy theories³² (e.g., antisemitic theories, QAnon) – in which a handful of powerful individuals secretly manipulate the entire world at will – represent a dangerous illusion that lies at the extreme range of this misconception. In regard to the economy for example, the capitalist class is neither purely subject to inevitable and impersonal economic laws, nor completely in control of all that takes place on the market³³.

Fourth, though it is convenient to distinguish between (material) interests and (ideological) worldviews to practically analyse social dynamics (as we have done so far and will continue to), we should recognise that ultimately, both are rooted in the imaginary institution of society. The main source of divergence between material interests is the antagonistic division of society in classes. Its historical emergence may have been favoured by many causal factors, but it

³² I consider this notion points to a serious and problematic phenomenon which has wide-ranging political implications. However, it calls for a cautious and parsimonious use since it is often raised in public debate as an abusive accusation aiming to discredit any critical opinion that simply acknowledges the fact that there are tremendous inequalities of power in contemporary societies, or that the dominant class has particular interests and actively defends it.

³³ We briefly approached this issue at the end of the sub-section on David Noble.

cannot be exhaustively explained through causal mechanisms as it essentially results from the surging of a new social imaginary signification:

“Starting at a certain 'moment', people saw one another and acted with respect to one another not as allies to help, rivals to surpass, enemies to exterminate or even to eat, but as objects to possess. Since the content of this vision and this action is perfectly arbitrary, we cannot see in what its explanation or its understanding might consist. How could we constitute what is the constituting element of historical societies?”
(Castoriadis 1975, p. 232-233)

The fifth point contradicts the liberal assumptions regarding a supposedly inevitable contradiction between the individual and the collective. To the contrary, Castoriadis argues that individual autonomy is inconceivable without collective autonomy and vice-versa. As we have seen, a society cannot exist without an explicit power establishing laws. An individual can only be free under law if he recognizes it as his own and this condition can only be met if he has the effective possibility – on an equal footing as every other citizen – to participate to its formation (even if his preferences did not prevail). Therefore, the autonomy of all is a fundamental concern of each, as the quality of the community deciding of our fate crucially imports us. A parallel implication is that equality and freedom are not contradictory but, on the contrary, imply each other: autonomy is the equal effective possibility to participate in the formation of the law. It is incompatible with substantial socio-economic inequalities since, on the one hand they can only lead to inequalities of power in the political sphere, and on the other hand, they are the expression of inequalities of power in the economic sphere.

According to Castoriadis, the project of autonomy demands direct democracy in both the political and the economic sphere. The elective principle has been considered aristocratic (thus antidemocratic) by all western philosophy from Aristotle to Constant, passing through Montesquieu or Rousseau. The founding fathers of both French and American modern liberal regimes vehemently condemned “democracy”, while the re-branding of these regimes as “democracies” only started in the mid-19th century (Dupuis-Déri 2004). The existence of irrevocable elected representatives has always systematically led to the dispossession of political power and initiative from the body of citizens. In almost every modern revolution, direct democracy has been rediscovered or reinvented: town meetings during the American revolution, sections during the French one, the Paris Commune, workers councils (*soviets*) in their initial form during the Russian and the Hungarian revolution, etc. (Arendt 1963; Castoriadis 1986). Under such conditions, the sovereign body is constituted of all people concerned and each time that delegation is necessary, it may be achieved through elections or lottery but delegates can be revoked at any moment. Modern liberalism did bring about decisive constitutional innovations that serve autonomy and must absolutely be preserved³⁴ – human rights, separation of powers, legal guarantees (e.g., protections of minorities) etc. But the sole focus of liberal thought on negative liberties³⁵ testifies of its presupposition that there is, “facing

³⁴ The recent international trend towards the degradation of liberal oligarchies into authoritarian oligarchies (e.g., Trump, Bolsonaro, Erdogan, Orban, Duterte, Macron’s repression of the yellow vests) is a very bad news in that respect.

³⁵ Isaiah Berlin (1959) has famously defined negative liberty as “the area within which a man can act unobstructed by others”.

the community, an alien power that is unmovable, impenetrable, and, in its very essence, hostile and dangerous, whose potential must, to the extent that is possible, have limits set on it” (Castoriadis 1996). In other terms, that the political power does not lie in the effective activity of the community but is alienated to the elected representatives and public officers that compose the modern State, defined as “a hierarchically organized bureaucratic apparatus separate from society and dominating it” (1996).

Finally, Castoriadis considers that the ancient Greek world provides a distinction between three spheres of human activities that a democratic regime must always separate and articulate: the *oikos* (the household), the *agora* (the marketplace), and the *ecclesia* (the assembly of citizens), which represent what he calls respectively the private sphere, the public-private sphere, and the public sphere. The *oikos* (the family household or private sphere) is the domain in which, in principle, political power cannot and should not intervene. Still, this cannot be taken in an absolute sense since there are always multiple exceptions: violence against family members is prohibited, children education is mandatory etc. The *agora* (the public-private sphere) corresponds to the marketplace or meeting point in the Greek world, it is the place where people encounter, discuss matters, contract with one another, publish and buy books etc. Again, this domain must have a relative autonomy from political power, though it never can nor should have an absolute one: law enforces private contracts, prohibits child labour etc. Finally, the *ecclesia* was the assembly of citizens representing the sovereign body in Athenian democracy; metaphorically, it represents the strictly political or public sphere, the locus of explicit power.

A large – if not the main – part of economic life, of what concerns the necessities of biological subsistence, used to take place in the household in premodern societies (the term “economy” comes from “*oikos*” and “*nomos*”), until industrial capitalism turned labour into a commodity exchanged within the modern equivalent of the *agora*. In modern societies, the economic sphere or sphere of work represents a core component of the “*agora*”; though the latter would also include multiple social activities trespassing the strict boundaries of the household (e.g., sports, culture, religion). Castoriadis opposes the democratic articulation of the *oikos*, the *agora*, and the *ecclesia* to the one characterizing other regimes. In totalitarian regimes for instance, the public sphere in principle absorbs everything in that every individual action is seen as political and represents a state concern. At the same time, this public sphere is not at all public in that it becomes the property of the totalitarian party which monopolizes power. In modern liberal regimes, the public sphere has also become in large part private according to Castoriadis: “the decisions that really count are those made in secret or behind the scenes (of the Government, the parliamentary system, and the party Apparatuses)” (1996). Ultimately, he considers that democracy can be defined as “the regime in which the public sphere becomes truly and effectively public – belongs to everyone, is effectively open to the participation of all” (ibid).

Autonomy and the imaginary institution of technology

How does the Castoriadian social ontology and conception of autonomy relate to the question of technology? What do they tell us about the relation between politics and technology?

Politics and technology are two types of human making (*faire*)³⁶. As we have seen, Castoriadis criticized the technocratic implications of Marxism: since it presents itself as a complete theoretical system enabling to seize the entire human history and its direction, it forces political action to conform to this theory and to be organized by the specialists who hold it. It thus confuses technology with politics and tends to substitute the former to the latter. Castoriadis rejected a common view among the revolutionary left of his time, according to which revolutionary politics demands such a complete and systematic theory of society and history as Marxism pretended to be. He argued that human making is never based on an absolute knowledge, nor does it consist in a blind reflex; it constitutes neither a perfect order nor a chaos. Making is always related to knowledge, but this relation and the type of knowledge in question may vastly differ according to the field of making. We may conceive of two extreme cases. At one extreme would lie an absolutely unconscious action, unrelated to any knowledge, a pure reflex. At the other extreme, would lie a purely rational activity which, based on an exhaustive knowledge (one enabling to decide any practical question relevant to its field), deploys the means to reach the ends it pursues. Technology approximately realises such an ideal. Only approximately though, because even within a limited domain an exhaustive knowledge is impossible and that such delimitation cannot be hermetic. The permeability of technical domains is well-described by Bruno Latour and ANT whose whole endeavour is to follow the networks of humans and non-humans that ceaselessly trespass such boundaries. It also explains that technicians focused on a limited field rarely foresee the multiple consequences their work will have as it enters the whole of the socio-natural world³⁷. Anyway, the immense majority of human activities (e.g., education, sport, art, psychoanalysis, politics) cannot be grasped neither as reflex nor as technology. Politics – and even revolutionary politics – does not need to be based on an exhaustive knowledge to be lucid and rational. Even scientific research, which constructs the theories underpinning technical disciplines rests on no certainty³⁸.

Castoriadis' understanding of the relation between politics and technical expertise is also deeply influenced by ancient Athens. Technology is always based on a specialised knowledge which has authority within its limited field; while there can be no political expertise since politics concerns the totality of society and universal values. Politics belongs to the realm of conflicting

³⁶ Despite their many convergences, Castoriadis's categorisation of human activities differs here from the one proposed by Hannah Arendt in the *Human Condition*. She divides the *vita activa* in three domains: labour (concerned with subsistence), work or making (which includes technology and art), and action (political action); while Castoriadis englobes technology, politics and all human activities of historical import within the notion of *making or doing*.

³⁷ Edgar Morin forcefully describes "technocratic competence" as "the one of the expert, whose global blindness envelopes the specialised lucidity" (Morin 2007, p. 44).

³⁸ The historical development of mathematics "has led *ipso facto* to a growing uncertainty as to the foundations and as to the meaning of this activity", while physics can be described as "a sort of Western, where one surprising event after another creates an accelerating pace, astounding even the actors themselves who first set off the series of actions" (Castoriadis 1975, p. 110).

opinions (*doxai*). Decisions concerning laws were taken in Athens by the *ecclesia* (the assembly of citizens) after hearing various speakers, including sometimes those who held a specialised knowledge relevant to the issue under discussion. However, the idea that there are experts in politics, “specialists of the universal and technicians of the totality”, has a deeply antidemocratic character and a dubious epistemological grounding (Castoriadis 1986). Nonetheless, it does underly modern representative regimes. When the *Polis* (city) needed technicians to accomplish tasks demanding a specialised knowledge, these technicians were elected by the *ecclesia* – military chiefs (*strategoi*) were elected for instance. The election of experts was justified by a principle which was central to Greeks and accepted by both Aristotle and Plato (despite its democratic implications): the best judge of the specialist is not another specialist, but the user. The warrior (rather than the blacksmith) is in the best position to judge a sword, the horse-rider (rather than the saddler) is in the best position to judge a saddle, and the *Polis* is in the best position to judge the work of a specialist it has requested. This principle is in complete opposition with the modern vision: “the dominant idea that experts can only be judged by other experts is one of the conditions of the expansion and increasing irresponsibility of modern hierarchico-bureaucratic apparatuses” (1986). I agree that experts should not be only judged by other experts in every case. However, I doubt that a strict and systematic application of the ancient Greek principle in every modern situation would make perfect sense. For instance, would it have been advisable that Anthony Fauci and the White House Coronavirus Task Force were required to run an election against other potential candidates (including ones with no medical background)? The scale of modern politics and complexity of modern technoscience significantly change the context and give a certain legitimacy to the idea that experts should be primarily judged by their peers. This legitimacy is probably much higher in the “purest” fields of scientific research as opposed to the most practical forms of technical applications, although they can rarely be neatly distinguished. Still, the Greek principle is here to remind us that the situated knowledge of lays has substantial value and may complement for the blind spots of technical expertise or the corporatism of experts. In that, it has multiple affinities with Andrew Feenberg’s argument in favour of democratic rationalization, defined as a public intervention in the technical sphere aiming to re-orient progress.

The affinities between the philosophies of Cornelius Castoriadis and Andrew Feenberg go much deeper. To the point that I propose to integrate them within a common framework.

Greeks mainly defined man as a talking-thinking creature (*zoon logon echon*) while moderns have mainly defined him as *homo faber*³⁹, as a “tool-making animal” to take the terms of Benjamin Franklin (quoted in Boswell 1791). However, the opposition between language and tool-making has been relativized by anthropology: “Man makes concrete tools and symbols [...] and both resort to the same fundamental apparatus within the brain. Language and tools are the expression of the same human property” (Leroi-Gourhan 1964, quoted in Castoriadis 1980). The imaginary institution of society deploys both through what Castoriadis calls the social representing/saying and what he calls the social making. Each of them also comprises an imaginary and an ensemblist-identitary dimension. Language is an essential part of the social

³⁹ According to Hannah Arendt, modernity is based on the victory of the *animal laborans* rather than of the *homo faber*. Her argument is interesting but it implies a strong distinction between labour and work which most authors do not make and which I have chosen not to make here.

representing/saying; while technology and all other social activities (e.g., politics, arts) compose the social making. The *legein* (distinguishing-choosing-positing-assembling-counting-speaking) is the ensidic dimension of the social representing, while the *teukhein* (assembling-adjusting-making-constructing) is the ensidic dimension of the social making. They resort to the same basic logical schemata with only one exception. The *legein* includes the signitive relation which enables to arbitrarily attribute a sign to a meaning (a signifier to a signified) by using something (the signifier) *in place of* something else (the signified). Conversely, the *teukhein* includes the relation of instrumentality, which refers that which is to that which is not and, at the same time, could be, by using something *in view of* something else. We have seen that for Castoriadis, technology is neither autonomous nor determinant. It does not have an immutable essence either and its delimitation and mode of coexistence with other social spheres is socio-historically instituted. These claims converge with the ones of Feenberg and the last one even provides a solid socio-ontological grounding to his anti-essentialist philosophy of technology. Castoriadis' social ontology is fundamentally open to the recognition of the hermeneutic dimensions of technology (social meaning and cultural horizon) and the formal biases of technologies and rational institutions, as it insists on the inseparability of the ensidic organization of the social world and social imaginary significations. If the ensidic and the imaginary dimension of social making are inseparable, then even the most rational social activities and institutions incorporate imaginary significations.

“Just as in the case of language the ensemblist-identitary dimension, through which language exists as a code, is impossible without and indissociable from its dimension of signification, through which language exists as langue; in the same way, teukhein, as ensemblist-identitary is inseparable from the imaginary dimension of making and of the magma of social imaginary significations which social making brings into being and through which this making exists as social making. The parallel runs deep and extends a long way” (Castoriadis 1975, p. 389).

The *legein* conceived in purely ensidic terms becomes the inconsistent fiction of a purely formal and closed linguistic system – an inconsistent fiction which would underly all structural anthropology according to Castoriadis. The *teukhein* conceived in purely ensidic terms becomes the inconsistent fiction of technology for and by itself.

“But, of course, every teukhein and every technique are always for the sake of something other than themselves and remain dependent on ends that do not result from their own intrinsic determinations. Whereas, for example, technology [(technique)] might appear as an 'end in itself', as it tends to appear in modern capitalist society, this positing of technology as an end in itself is not something that technology, as such, could posit; this positing is imaginary. Technology stands today for the pure social delirium presentifying the phantasy of omnipotence, a delirium which is in large part the 'reality' and the 'rationality' (with, but even more without quotation marks) of modern capitalism” (1975, p. 389-390).

Technology and *teukhein* are always serving ends that they cannot posit themselves. And even when technology seems to have become an end in itself – as it often does in capitalist societies – it is only because the social imagination has posited technology as such.

“I should underscore the circular implication which exists between the two [socio-historically instituted needs and technologies of production] and which, here again, makes teukhein and imaginary significations inseparable not only 'at their extremities' but in medias res⁴⁰: a need can be posited as a social need (and not as a dream or the Promised Land) only to the extent that what could satisfy it appears in and through social teukhein as realizable, even if only virtually. Likewise, the positing of social needs orients and determines, constantly and internally, in innumerable ways, the modalities and concrete instrumentations of teukhein” (1975, p. 390).

There is a circular implication between the imaginary institution of social needs and the capabilities of the *teukhein* (especially of technology). This point frontally contradicts Ellul's claim that social needs in modern societies are determined by the autonomous development of the technological system, that what the latter renders possible will become needed. For Castoriadis, it is true that only what appears reachable through the *teukhein* may be instituted as a social need, but this does not mean that it will always be. Furthermore, as the implication is not unilateral but circular, the positing of social needs also orients and determines the *teukhein*. And the positing of social needs does not merely posit ends that should be reached by the most rational means, it also constantly and “internally” shapes the structure of these means. Social imaginary significations not only lie at the “extremities” of technologies and rational institutions by positing ends; they bias these media from within, they lie “*in medias res*” (in the middle of things). Since imaginary significations are inseparable from the ensidic organization of society, Castoriadis is not only able to argue that the construction of technologies is influenced by social factors, but that technological modernity as a whole constitutes a curious imaginary endeavour: “technology is a project whose meaning remains uncertain, whose future is obscure, and whose end is undetermined, after consideration that, obviously, the idea of making ourselves 'masters and possessors of nature' is strictly meaningless” (1975, p. 111). Likewise, Castoriadis can assert that: “The bureaucratic universe is permeated through and through with the imaginary” (1975, p. 239).

For all these reasons, the social ontology and political theory of Castoriadis may be combined with essential traits of Feenberg's philosophy of technology (instrumentalization theory and the concepts of formal bias and democratic rationalization). Technology appears as a social institution among others. As part of the instituted, it forms the conditions and constraints under which the instituting process occurs without determining it. As a dimension of the instituting, it has many specificities (that we have discussed at length) as it is more influenced by functional imperatives and based on a specialised knowledge. As any social institution, once established it has a certain inertia and tends to escape society's control. Autonomy understood as the explicit and lucid self-institution of society should therefore be extended to the sphere of technology; and this is, pushed to its full potential, the meaning of democratic rationalization.

Still, a major issue remains: to what extent does the instituted technological apparatus, technical disciplines and organizations constrain the instituting process and the prospects of autonomy in the political and economic sphere?

⁴⁰I underlined this part.

This will be discussed in the next sub-section. For now, I propose to simply mobilize a few concepts enabling to grasp the types of constraints which are constituted by instituted technology. In other terms, we have discussed in-depth the social construction of technology, which contradicts the thesis of unilinear progress, but much less the thesis of determination of society by the technological base⁴¹. Obviously, the second thesis is dramatically weakened if the first collapses: society cannot be unilaterally determined by technology if technology is a social construction. Still, instituted technology constitutes conditions and constraints for the instituting process, and we are justified to question their type. First, the Latourian concept of “prescription” points to the social commands that are consciously inscribed into technical artefacts and systems by their designers. Second, the concept of “affordances” (Wellman et al. 2003) has become increasingly widespread in STS and communication studies and we may adopt it as well. Yochai Benkler explains it in simple terms:

“Different technologies make different kinds of human action and interaction easier or harder to perform. All other things being equal, things that are easier to do are more likely to be done, and things that are harder to do are less likely to be done. All other things are never equal. That is why technological determinism in the strict sense – if you have technology “t,” you should expect social structure or relation “s” to emerge – is false. [...] Print had different effects on literacy in countries where religion encouraged individual reading – like Prussia, Scotland, England, and New England – than where religion discouraged individual, unmediated interaction with texts, like France and Spain. [...] Neither deterministic nor wholly malleable, technology sets some parameters of individual and social action. It can make some actions, relationships, organizations, and institutions easier to pursue, and others harder.” (Benkler 2006, p. 17)

In this respect, the technical environment appears comparable to the natural one, and its relation to the instituting process comparable to the leaning of society over the natural stratum: society does not reproduce or reflect the organization of the natural or technical stratum, it is not determined by it, but finds in it a series of conditions, supports and stimuli, stops and obstacles. Third, technology is “ambivalent” in that its affordances may favour multiple good or bad effects. They have multiple potentialities that may be actualized or not. The way in which industrial or digital technologies were shaped overtime for instance, did actualize some of their potentialities while abandoning others (see Annex 1).

⁴¹ These are the two claims that compose the idea of techno-determinism as we have explained previously.

Readings of the Russian Revolution

I propose to conclude this chapter with a comparison of the perspectives of three authors on the issue of autonomy in the industrial age and its relation to their analysis of the bureaucratic degeneration of the Russian revolution: Jacques Ellul (1912-1994), André Gorz (1923-2007) and Cornelius Castoriadis (1922-1997). There is no doubt that these three authors are ideologically and culturally very close: they are all French intellectuals of (roughly) the same generation, champions of libertarian socialism (thus anti-capitalist and anti-statist), pioneers of environmentalism and even degrowth. Yet, their ideological proximity makes even more salient their divergences on the issue of techno-determinism and the possibilities of autonomy in the industrial age – enabling us in a certain way to have an “all other things being equal” sort of reasoning. Regarding debate (B), all three authors are fierce critiques of technocracy. Regarding debate (C), as pioneers of degrowth, they are all deeply opposed to cornucopianism. And, if none could be properly called a technophile, Ellul is without a doubt the most technophobic while Castoriadis is probably the least. Regarding debate (A): Ellul is a strong techno-determinist and belongs to the category of substantivism (with Weber, Heidegger, and McLuhan); Gorz has an essentialist understanding of technology but is not a strong determinist (similarly to Habermas); and Castoriadis’ view of technology is anti-essentialist and close to Feenberg’s critical constructivism.

According to Jacques Ellul (1982), industrialisation can only occur with capitalisation and proletarianisation. In other terms, it requires accumulated capital, a proletariat, and the exploitation of the latter by the former. How does primitive accumulation happen? How does large amounts of capital (e.g., money, lands, industrial means of production) get accumulated in the hands of a few men while the vast majority become “free” labourers, dispossessed from the means to provide to their own subsistence, and thus forced to sell their labour power on the market? This historical process was famously described by Marx (1867a) as a massive and brutal movement of expropriation of the rural populations of Great Britain by the dominant classes (the lords, the royal family and Scottish chiefs of clan) that took place from the 16th to the 19th century. This founding episode of modern capitalism, also known as the enclosure movement, will be further discussed in following chapters⁴². Primitive accumulation was also fed by the exploitation of slaves and natural resources of the non-western world. On this base, the capitalist mode of production was set in motion and the industry could develop: the exploitation of labour by capital produced a surplus value that could be reinvested in new means of production feeding further accumulation.

Ellul contends that industrialisation everywhere required a comparable process of primitive accumulation leading to a form of capitalism – in both the western and soviet bloc. He agrees with Karl Kautsky’s criticism of Lenin saying that a proletarian revolution could not take place

⁴² See especially Chapter 2, “Enclosures and progress”.

in Russia in 1917, simply because there was no proletariat. A proletarian revolution can only occur in a highly industrialised context. He thus interprets the October revolution as a *coup d'Etat* organized by the Bolshevik party. The party then had to create a proletariat and it did so through the means previously employed in the West. Koulak peasants were massively expropriated and sent to labour camps in which they were exploited using the latest organizational methods to develop the heavy industry. Labour camps produced and exploited a proletariat in the same way that the early capitalist industry did. It pushed the intensity of violence and exploitation further because the soviet state wanted to develop the industry as fast as possible. The soviet proletariat was divided between “free” workers and the forced workers of camps, just as the western proletariat had also been divided between unequal branches (e.g., skilled vs. unskilled, unionized or not, national vs. immigrant). The USSR represented a form of state capitalism:

“Indeed, the worker is not exploited by one boss anymore, he is not working for his benefit... But does he work for... the community? Of course not! He works for the state, which dedicates 40% of what it takes off wages to military expenditures or spatial adventures, which the worker would happily exempt himself from, had he ever been consulted” (Ellul 1982, p. 49).

The party-state’s ideology started from the idea that abundance and techno-economic development were necessary means to establish socialism, until these means turned into the ultimate ends of the regime: objectives of justice, freedom or equality disappeared behind the ones of productivity, growth and development. Even as production developed, it never appeared sufficient; techno-philia and productivism remained the compass of the soviet bureaucracy.

For Ellul, technological necessity underlies every modernisation process: industrialisation requires capitalist exploitation and social domination, whether it is under the realm of private or state property. Rejecting the alienation of modern capitalism would imply the abandonment of the technological system as a whole, thus a brutal economic regression:

“A revolutionary radicalism that would claim to address the problems raised by existing technology, one oriented towards self-management, the suppression of the state, of bureaucracy, producing for ‘natural needs’ etc. would imply destroying the whole apparatus, which means, with no possible discussion, an economic regression. Radical communism is completely unable to receive the legacy of developed capitalism” (1982, p. 19).

Only between 1982 and 1988 (as we have seen), Ellul believed that a profound revolutionary change, inspired by libertarian socialist ideals, might be able to re-appropriate and re-orient the technological system and actualize the emancipatory potentialities of digital technologies to institute a self-managed society.

André Gorz and Cornelius Castoriadis illustrate two conceptions of emancipation: one is *the exit from* labour and from the technosystem (Gorz and Habermas), while the other is *the transformation of* labour and of the technosystem (Castoriadis, Feenberg, Marcuse and even

Marx); external limitations or internal transformations. To be sure, these conceptions of emancipation may take multiple forms, can be combined in numerous ways, aim for the external limitation of some features of the technosystem and the internal transformation of others, blurring their distinction to a great extent. Still, I believe this opposition tells a lot and should not be neglected.

André Gorz believed that the industrial system is intrinsically incompatible with self-management:

“Industry arose from capitalism and bears its indelible mark. [...] Industrial machinery was born out of the separation of the workers from ‘their’ product, and the means of producing them, and renders this separation necessary [...] It cannot, by its very nature, be appropriated by the workers and this will continue to be the case even when private ownership of the means of production is abolished and, with it, the supreme importance of profit” (Gorz 1988, p. 91).

It is sometimes unclear the extent to which Gorz understands how much technologies are socially constructed – how diverse the paths open to technical progress are and always have been. Still, there is no doubt that he is much less deterministic than Ellul. It is clear from this quotation that, to him, industrial technologies are alienating because they were made by capitalist relations of production and tend to perpetuate them. Their alienating features lie at two levels. First, industrial machines and factory organization deskill labour and reduce workers’ control over it to promote efficiency within the context of an authoritarian management. While the craftsman used his tools to act on materials according to his visions and intentions, the industrial machine does not “transmit the worker’s activity to the object; this activity, rather, is posited in such a way that it merely transmits the machine’s work, the machine’s action, on the raw material”, thus making the machine “itself the virtuoso, with a soul of its own...” (Marx 1857, quoted in Gorz 1988, p. 93). Second, the radical deepening of the division of labour that came with industrial development was made possible by heteronomous modes of coordination (bureaucracy and market, planned and spontaneous hetero-regulation). In order to avoid a brutal economic collapse that would bring us back to pre-industrial times, Gorz considers these modes of coordination must now be kept. Initially, the subdivision of tasks in the factory was mostly a means to control the workforce, but it progressively led to a macro-social division of labour which is largely irreversible. Like Ellul, Gorz believes that the industrial system is alienating as it implies either capitalism or state capitalism (which always come with a bureaucratic dictatorship), while rejecting it would mean an undesirable return to pre-industrial communities. Society is divided between a sphere of heteronomy constituted by the industrial-bureaucratic mega-machinery and a sphere of autonomy existing in civil society, outside of labour. In the heteronomous sphere, individuals do not have a say on the aims pursued by the bureaucratic organisations they work for, and these aims are largely unintelligible or hidden from them. The aims proposed to their pursuit are different, their motivation for working is not intrinsic (work is not an end in itself) but extrinsic (e.g., money). At first, the main motivation driving wage workers was survival. After a certain level of economic development, they were able to obtain enough money from their

work to afford a high-level of consumption, meant to compensate the frustration generated by their work.

In Marx's view, emancipation would be achieved through the subordination of the social process of production to the common control of workers, through the substitution of voluntary collaboration to functionally integrated work. The collective appropriation of the means of production would enable to reconcile individual and collective aims. Individuals would live work as a mode of self-expression and voluntarily contribute to the social wealth: "we shall see the triumph of a collective *poiesis* which is no longer the labour of serialized and specialized individuals but the self-activity of individuals collaborating consciously and methodically" (Gorz 1988, p. 51). The Marxian utopia of work thus presents itself as a complete triumph of Reason: on one hand, it wants to realise both the scientific domination of nature and reflexive scientific mastery of that process of domination, on the other hand, it wants the will of each to coincide with the will of all. Marx did not give much indications on the way this could be practically achieved and many Marxist authors have refused to see in the soviet model of central planning the only way, or even a possible way to realise it (Coutrot 2002). Nevertheless, the promise and justification of the plan in the USSR was that it would realise "society's reflexive consciousness of itself as a collective enterprise based on voluntary collaboration" (Gorz 1988, p. 71). And this promise clearly was not met. According to Gorz, the size and complexity of the system made it impossible for individuals to acquire a lived experience of the macro-social collaboration of each specialized units and workers, so as to grasp the meaning of their participation in the social totality. Therefore, the plan could only establish "Reason as a separate power exercised over them [the workers] and not by them" and the dictatorship of those who embodied this Reason – the party authorities (1988, p. 75). Gorz contends that this failure cannot be only explained by historical reasons and by the specificities of the soviet model of planning. It failed for a deeper ontological reason:

"The Marxian utopia according to which functional work and personal activity could be made to coincide is ontologically unrealizable on the scale of large systems" (1988, p. 76).

Therefore, the road to emancipation can only go through the reduction of the sphere of heteronomy and the expansion of the sphere of autonomy. Industrial technology, bureaucracies and markets form the realm of heteronomy. Gorz's argument attacks markets as such – rather than only capitalist markets – for fostering heteronomy. Conversely, it praises the non-market sphere and the value of what is *non-quantifiable*. His political proposals changed overtime but were informed by this logic at least since "*Adieux au proletariat*" (Gorz 1980)⁴³. I would even argue that he abandoned the idea of an emancipatory transformation of the industrial system as early as 1974⁴⁴ – while he still supported it in "*Critique de la Division du Travail*" (1973). Indeed, in an article published that year (Gorz 1974), he suggested that an exit from the technosystem could be progressively achieved through a re-articulation of the state, the market and local self-managed production. Every essential good and service would be produced and offered gratuitously by a state-owned, centrally planned industry. The market sphere and private

⁴³ This is the chronology proposed by Dominique Méda and Denis Clerc (2009) or Carlo Vercellone (2009).

⁴⁴ Probably under the influence of Ivan Illich, who published *Tools for Conviviality* in 1973.

property of means of production would not be abolished but would slowly decline as more and more people decide to be content with working less and consuming only basic goods. Local crafts and self-managed production would be enhanced by publicly provided workshops, enabling individuals and groups to self-produce all the superfluous. As productivity grows, people would work less in the public industrial sector and have more time to develop self-managed production. In the late 1980's (1988, 1991), he followed this logic with a less radical tone to become a leading theorist and promoter of the reduction of working time. In the early 2000's, he started to support the idea of a universal basic income (2002). And, in his last days (2007), he put his hopes in the free software movement and digital fabrication tools, to enhance the capabilities of autonomous self-production outside the realm of bureaucracies and markets⁴⁵. Regarding the alternative between reform or revolution, Gorz proposed an influential response: “*revolutionary reforms*”. All reforms are not reformist he argued. Reformist reforms “immediately dismiss objectives and demands [...] that are incompatible with the conservation of the system”. On the contrary, revolutionary reforms aim to surpass the existing social order, and especially, the capitalist mode of production. A revolutionary reform is not “determined in accordance with what *is* but with what *ought* to be”. Thus it “makes the possibility to reach its objectives depend upon political and economic means that are yet to deploy” (1964).

A few more words should be said about Gorz's approach to rationality and modernity. As Habermas, he believes that there are two main forms of rationality (instrumental and communicative rationality) and that modern rational institutions are essentially based on instrumental rationality. Modernization represents a radical differentiation of the different spheres of life (which reveals their essence) and the secularization of their corresponding activities. Modernization and (instrumental) rationalization should be reflected upon and given a meaningful orientation. There are ontological and existential limits to (instrumental) rationalization that “can only be crossed by means of pseudo-rationalizations, themselves irrational, in which rationalization becomes its opposite” (1988, p. 14). Gorz mostly focuses on a specific type of instrumental rationality: “economic rationality” which is characterized by its will to economise. That is, to organize the factors of production (capital, labour, natural resources) in the most efficient manner, to maximize the production and minimize the costs, in order to maximize the profit. Before 1974, he called this the “economic rationality of capital”, thereby suggesting that a socialist economic rationality was conceivable. He later replaced this notion with an essentialist conception of “economic rationality” which insisted too much on the idea that there was only *one* “most efficient” means to increase productivity regardless of the social context. Economic rationality thus could not be transformed from within; it could only be contained from outside. Gorz's proposal to reduce and share working time aimed to orient the rationalization process towards the enlargement of free-time devoted to autonomous activities, rather than leaving economic rationality progressively colonize new domains (e.g., leisure, domestic activities) by creating new jobs that ultimately tend to reduce all social relations to commercial ones.

⁴⁵ This text (*La sortie du capitalisme a déjà commencé* in Gorz 2007) exemplifies an argument that has later been developed by what I call theories of the common(s) as a mode of production.

Castoriadis believed that the industrial system could be re-appropriated and transformed to establish self-management in the sphere of work through a revolution.

The bureaucratic and authoritarian outcome of the Russian revolution was contingent according to Castoriadis (Cardan 1964)⁴⁶. In the modern world, bureaucracy has usually emerged at one of the two extremities of economic development: as the organic product of the maturation of capitalist societies or as an obligatory path towards industrialisation for underdeveloped societies. In the first case, the concentration of production within large factories eventually leads to the emergence of a techno-economic bureaucracy that assumes the management of sectors which are too wide to be controlled by an individual capitalist owner. Simultaneously, a politico-statist bureaucracy develops as the state takes on new functions (e.g., education, health, transports) and even a workers' bureaucracy as large unions get incorporated to the established order. In the second case, the local bourgeoisie is incapable to launch industrialisation and a communist or military bureaucracy emerges from the social void (usually after an open crisis) to substitute it in its function of primitive accumulation. This scenario actually contradicts the Marxist pattern: bureaucracy here does not grow progressively with a new mode of production, the development of which would have become incompatible with the superstructures associated with the old one. Instead, it arises from the social void. The Chinese bureaucracy, for instance, is not so much a product of industrialisation than the actor that provoked it. Castoriadis concedes that "at the current moment, and in the absence of a revolutionary solution at the international level, the industrialisation of a backward country can only be reached through its bureaucratisation" (Cardan 1964).

However, Russia would represent a third type of case, in which a bureaucracy emerged from the degeneration of a proletarian revolution. Contrarily to Ellul, Castoriadis insists that Russia's industrialisation had significantly started at the time of the revolution: "Russia was the world's fifth industrial power in 1913" (Cardan 1964). He also refuses to reduce the October revolution to a *coup d'Etat*: the Russian proletariat, he argues, appeared as a rather autonomous force in this period and not as a simple instrument manipulated by the Bolshevik party. Indeed, the working class freely chose to support the Bolshevik party at first and autonomously undertook a variety of actions: it expropriated the capitalists to self-manage production and created independent instances (*soviets* and factory committees). The Bolshevik party then managed to substitute its centralized direction over political and economic institutions to these germs of self-management. As Lenin clearly proclaimed it, the party wanted to establish state capitalism as a first step towards socialism:

"In the first place, economically, state capitalism is immeasurably superior to our present economic system.

In the second place, there is nothing terrible in it for Soviet power, for the Soviet state is a state in which the power of the workers and the poor is assured. [...]

Socialism is inconceivable without large-scale capitalist engineering based on the latest discoveries of modern science. It is inconceivable without planned state organisation,

⁴⁶ Paul Cardan was one of the nicknames used by Castoriadis.

which keeps tens of millions of people to the strictest observance of a unified standard in production and distribution” (Lenin 1918).

The State and capitalist technology (e.g., machines, Taylorism) are presented by Lenin as neutral means that may as well serve socialist ends. Industrial machines and organisational methods have not been shaped by capitalist social relations, as they embody an autonomous, objective and extra-social rationality. They are value-neutral and belong to the realm of facts. Consequently, they may be used indifferently to serve any ends. Similarly, for Trotsky, the decision to have a director or a panel of workers at the head of a factory has no political content: “it can only be correct or incorrect in terms of administrative technique” (Trotsky 1920, quoted in Cardan 1964). The opposition to the bureaucratisation of the revolution was clearly expressed within the Bolshevik party (by minoritarian fractions such as “the left communists” or the “workers opposition”) and outside by revolts (e.g., Kronstadt), before getting definitively crushed in 1921.

In complete opposition to the Bolshevik ideology, Castoriadis affirms that capitalism “does not utilize a socially neutral technology for capitalist ends” but “has created capitalist technology, which is by no means neutral”. Indeed, capitalist technology essentially aims “to subordinate and dominate the producers” (1988). Consequently, “the hallmark of socialism is the transformation it will bring about in the nature and content of work, through the conscious and deliberate transformation of an inherited technology” (1988). This deliberate transformation of the instituted capitalist technology, of the technological structure of work, is the content of socialism: the socialist revolution should enable the transformative process to begin while its realization represents the entry into communism. Socialism understood in these terms consists in what Feenberg calls democratic rationalization. Indeed, for Castoriadis, not only self-management is technically feasible, but it represents an incomparably more rational organisation of production than the present one. The conflict between direction and execution, that is, between capital and its managerial delegates on the one hand, and workers on the other, has always been a gigantic source of waste. A self-managed society consists in “a society where all the decisions are taken by the community which, each time, is concerned by the object of these decisions” (1979): decisions concerning the workers of a shop floor should be taken by them, decisions concerning the workers of different shop floors should be taken by them or their elected and revocable delegates, the same logic prevails at the level of the firm, the neighbourhood, and the whole society. The examination of the functions of bureaucratic (that is, hierarchical) management reveals that, most of them are rendered necessary by the existence of hierarchy itself, while the others could easily be collectivised. The essential function of hierarchy is the organisation of constraint; but constraint is essentially needed because there is a hierarchy – because workers feel alienated and exploited, do not have control over the organisation of their work nor its purpose. Autonomy in the economic sphere still requires discipline and sometimes even constraint, just as it does in the political one. But the discipline, its form and purpose, as well as the possible sanctions attached to its transgression, would be decided by the community itself rather than by a separate bureaucratic apparatus.

Another common argument proposed against self-management is that only those who hold a certain knowledge and competence should be in charge. But enterprises are not currently

managed by the most competent or knowledgeable people. They are controlled by managers who do not hold a specific technical knowledge but are hired by capitalists to represent their interests. Furthermore, if no one denies that some individuals hold a specialised technical knowledge that is essential in production, this does not mean that the best way to use it is to give them the command of entire teams of workers. Indeed, engineers and specialists are usually confined to their limited domains. Managers are not specialists of every domain. They receive suggestions from different technical advisors and, on this base, judge and decide: a self-managed community could make decisions at least as informed as theirs. Self-management thus implies the cooperation between technical experts and productive workers. In addition, some of the most important decisions in production do not regard the mastery of nature but the organisation of workers. For this reason, their perspective is essential and an organisation disregarding it cannot be properly rational. Castoriadis highlights that, in modern industry, workers often have to re-adapt and transgress some hierarchical commands so that production can work (1979). Even if we suppose that such an organization were rational in pure terms of productivity, it would not be acceptable as it reduces workers to instruments of production – a reduction which is far from being rational in itself⁴⁷. A self-managed worker community could decide that a more fulfilling and creative work is preferable to a little increase in productivity. For such a choice, no scientific criteria can be found, the only valid criterion is the judgement of the community.

Castoriadis supports an absolute equality of revenues and wages. Firstly, because he finds no normative principle able to justify any form of revenue inequality⁴⁸. There are no objective criteria to compare the different skills and knowledge of individuals (e.g., engineer vs. plumber). And if society financially supports the training of individuals, why would those who had the opportunity to study be further advantaged by a higher wage? If someone has an innate talent, exercising it is a source of pleasure and money is not the main driver: “If Einstein had been interested in money, he would not have become Einstein but, more probably, a mediocre boss or trader” (1979). And if the least appealing tasks were to be rewarded by higher revenues, garbagemen or industrial workers would probably receive more than managers. Second, Castoriadis believes that self-management requires a market of goods and services to orient production based on the expression of social demand. Against this backdrop, revenue inequalities would unfairly distort its expression by giving to richer people more weight.

The direct democracy exercised first at the level of the enterprise would be expanded to the level of society *in toto* through a federal organisation of councils composed of revocable delegates. This federal organisation would establish plans fixing objectives of production at every level (from the factory to the whole economy). Such plans should function as a starting point of economic life to be constantly revised and modified as necessary, rather than as “a dead

⁴⁷ « To treat a person as a thing or as a purely mechanical system is not less but more imaginary than claiming to see him as an owl; it represents an even greater plunge into the imaginary. For not only is the real kinship between a man and an owl incomparably greater than it is with a machine, but also no primitive society ever applied the consequences of its assimilations of people with things as radically as modern industry does with its metaphor of the human automaton » (Castoriadis, 1975, p. 238).

⁴⁸ On that point, I have a slight divergence with Castoriadis: small revenue inequalities can probably be tolerated to reflect a difference of efforts/implications in the productive sphere and individual preferences regarding the balance between more work and consumption or less work and consumption.

technical rationality, given once and for all” (1988, p. 130). As early as 1955, Castoriadis argued that ICTs considerably facilitated the planning process by ensuring the communication of relevant data to each decision-making entity, thus facilitating the fixation of objectives and clarifying the modality of their achievement⁴⁹. I do agree with the general argument of Castoriadis in favour of self-management. However, I believe it can be improved in some of its technical specifications. Many of today’s socialist economists would probably consider that it promotes a conception of planning which is too extensive, and thus, quite problematic (e.g., Borrits 2018; Coutrot 2002; Devine 2019; Friot 2012). They tend to promote more flexible and feasible conceptions of democratic planning which could significantly improve Castoriadis’ socialist project. The institutional propositions of these economists have many differences. However, I believe the role they assign to planning can largely be explained using Pat Devine’s distinction between “market exchange” and “market forces”. The former refers to the sale and acquisition of commodities resulting from existing productive capacities; whereas the latter refers to the way changes in productive capacities are triggered by the investment/disinvestment of capital searching for profit-maximization in different economic sectors. Devine’s proposal combines self-managed enterprises that freely engage in market exchange, with the replacement of market forces by a democratic planning of investment realised by a federal organisation of the representatives of each groups having a stake in a productive sector (e.g., workers, furnishers, consumers, communities living close to the factory). The advantage of such a model is that it does not require to plan exhaustive objectives of production for the whole economy, but only to allocate investment based on collective deliberation. In spite of their differences with Pat Devine’s specific institutional proposition, the models promoted by the other economists cited above follows this overall logic: investments should be democratically planned, while self-managed enterprises should have significant autonomy in their economic choices.

Among these three perspectives on autonomy in the industrial age, my support goes to the one of Castoriadis. If his project of autonomy may appear “maximalist” in that it aims for the complete abolition of heteronomy, class antagonism, as well as economic and political inequalities, it may at least be kept as a normative horizon. At a more practical level, I believe that there was no technical (or ontological as Gorz argued) imperative rendering impossible the establishment of a form of libertarian socialism based on the self-management of industrial production by producers⁵⁰. Clearly, this does not mean that it would have been an easy or unhazardous realisation, only that it pertained to the domain of the possible and of the desirable. Gorz has a point in that the level of complexity affects the democratic quality of what may be called self-management: the self-management of a farm by a community of ten people cannot be compared to the “self-management” of a nation-wide industrial economy. Various forms of captures of power, hierarchical trends or – more generally – autonomization of institutions from society’s control remain a constant threat, which is multiplied as the scale of institutions increase – the revocability of delegates for instance is not an infallible control mechanism. Still,

⁴⁹ « In short, the entire ‘planning activity’ of the Russian bureaucracy for instance, could be transferred to an electronic machine from now on” (Chaulieu 1955).

⁵⁰ I speak in the past tense because this chapter focuses on the industrial age, but this remains perfectly true today.

in my view, there was no technical or ontological necessity leading any attempt to establish economic democracy in the industrial age to degenerate in the bureaucratic dictatorships that “really existing socialism” happened to be.

Throughout this first chapter, we have discussed various theories of technology (primarily engaged in debate A) and their relation to the question of autonomy in the industrial age. This discussion enabled us to introduce important concepts (e.g., technology, techno-determinism, technosystem, capitalism) and to present different theories of technologies whose influence over theories of the common(s) will be assessed in chapter 3. It also allowed us to start developing a personal normative position which combines the philosophies of Andrew Feenberg and Cornelius Castoriadis and already gives significant elements of answer to our fourth research question⁵¹. That normative position argues in favour of the radicalisation of democracy in the political sphere and its extension to the economic sphere (equivalent to the *agora* or public-private sphere), considering this extension was both possible and desirable in the context of the industrial age. The next chapters will question how the terms of the question of autonomy may have (or not) been altered by: on the one hand, the transformations of society and its structuration by the technosystem in the digital age (*Chapter 2*); on the other hand, the emergence of various theories of the common(s) (*Chapter 3*).

⁵¹ How should we understand and institute the relation between politics and technology?

Chapter 2: Crossed Genealogies of the Digital Age

“Men fight and lose the battle, and the thing that they fought for comes about in spite of their defeat, and then it turns out not to be what they meant, and other men have to fight for what they meant under another name.”

William Morris, *A Dream of John Ball*, 1888, p. 14

“Horses on their side are really lucky, they suffer the war just as we do, but nobody expects them to subscribe to it, to pretend they believe in it. Unfortunate but free horses! Enthusiasm – that curse – is reserved to us!”

Louis-Ferdinand Céline, *Voyage au bout de la nuit*, 1932, p. 38

Modern societies are structured by a vast technosystem composed of rationally designed technical artefacts and institutions such as markets and administrations that are informed by rational technical disciplines. Only nascent under mercantile capitalism (16th-18th century), the technosystem really started taking shape with industrial capitalism (1780-1975). This context biased its development towards aims of profit (regardless of social and environmental implications), control and domination, although myriads of struggles attempted – with mitigated and temporary successes – to limit these trends and restructure the biases of the system to integrate democratic, social and environmental objectives. I have argued that an emancipatory perspective should embrace both the size-reduction of the technosystem (limiting the scope of technical manipulation, administrative control, and commodity exchange) and its radical transformation by a democratization of management and an alternative to the private property of the means of production.

This chapter aims to draw attention to important elements of the contemporary context of struggles over the technosystem. It will do so by describing the crossed genealogies of some significant transformations of the technosystem and of the critical discourses about it which occurred in what I call the “digital age”. The concept of “digital age” is meant to identify and

analyse these important features of the technosystem that have emerged in the last fourth of the 20th century and contrast with the precedent period, the “industrial age” (1780-1975). The opposition between the industrial and the digital age should not be overstated: our world remains structured by a capitalist technosystem within which industry plays a decisive role. I do not either intend to claim that our historical situation is mainly characterized by the centrality of digital technologies⁵². Rather, I describe our period as the digital age to focus the analysis on some contextual elements whose significance I want to highlight, assess, and question.

The profound restructuration of the technosystem that occurred in the digital age can only be understood in relation with the intense struggles of the late 1960’s and early 1970’s (Tronti 1966), which formulated their essential aspirations in terms of autonomy. Two main lines of restructuration may be identified: neoliberalism as a hegemonic ideology and cognitive capitalism as a historical system of accumulation. Neoliberalism aims to reshape the technosystem and society as a whole according to the norm of market competition (Dardot et Laval 2010a). Cognitive capitalism represents a third historical system of accumulation (coming after mercantile and industrial capitalism) in which “the intellectual and cognitive dimension of labour becomes dominant and the central stake of capital valorisation and forms of ownership directly regards the transformation of knowledge into a fictive commodity”⁵³ (Vercellone 2008). The development of cognitive capitalism is inextricably linked with the ubiquitous spread of digital technologies and the central role they have taken in the coordination of specialized knowledges and labours. Administrations and their management were thus re-designed to integrate norms associated with markets and digital technologies. Furthermore, the flows of capital, commodities and information galvanized by neoliberal globalization as well as the technological infrastructure (communicative, energetic and logistic) supporting them have often been portrayed as networks. In spite (or because) of its vagueness, this image played a major role in the restructuration of the technosystem. In the wake of the antibureaucratic struggles of the 1960’s, which targeted the pyramidal structure of administrations, the “network” appeared as an organisational paradigm better-suited to the new cultural aspirations and techno-economic context (Boltanski et Chiapello 1999).

The chapter is divided into three sections. The first section defines and articulates the concepts of neoliberalism, cognitive capitalism, and neo-management to point out the main characteristics of the digital age, while showing how they respond to the struggles of the late 1960’s and early 1970s. The second section focuses on the different business models developed by cognitive capitalism and on the role of the free software movement in their evolution. The third section discusses the emergence of the reference to the “commons” in political discourse and its relation to the sociotechnical context of the digital age.

⁵² Approaching our time through the perspective of environmental destruction for instance, by using the concepts of “anthropocene” or “capitalocene” is as much – if not more – legitimate. But environmental destruction and technology are ultimately two sides of the same coin, and discussing one necessarily amounts to discuss the other, only through different lenses.

⁵³ Despite my use of this concept developed by a group of intellectual including Michael Hardt, Toni Negri, Carlo Vercellone, Yann Moulier Boutang etc. my analysis will significantly differ from theirs on essential points as it will become clear in the next pages.

Neoliberalism and Cognitive Capitalism

1965-1975: a decade of crisis

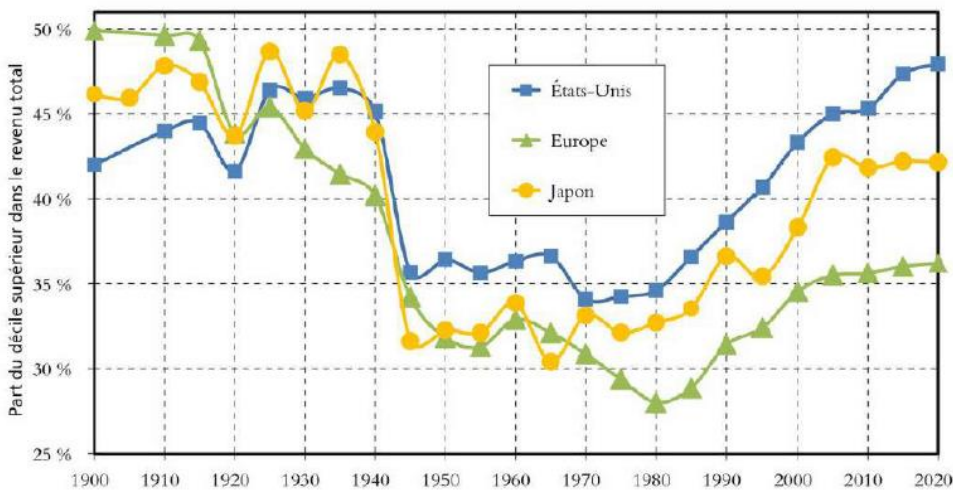
The world experienced a profound crisis of capitalism and power relations between the mid-1960s and the mid-1970s. Capital came out of the decade reinforced and re-established its hegemony over labour after having substantially restructured itself. The undesired outcome of the anti-capitalist struggles of the 1960s was an accelerated transition from industrial to cognitive capitalism and the replacement of the Fordist compromise by neoliberalism. As the intensity of social struggles grows around the world (e.g., Chile, Hong Kong, Lebanon, France, Algeria, Catalonia, USA) (Godin 2019), suggesting more and more comparisons between the current cycle of struggles and the one of the 1960s, it becomes increasingly urgent to reflect upon this unexpected turnaround.

Under mercantile capitalism, industrial production remained a “mere accessory to commerce” (Polanyi 1944, p. 78). Capitalist merchants subcontracted production to independent workers or workshops (the so-called *putting-out system*) or organized it within manufactures equipped with cheap machinery, where workers were skilled and remained in control of a productive process largely dominated by their artisan know-how. In Marxist terms, we may say that the subsumption of labour under capital was only *formal*. As industrial capitalism developed, the subsumption of labour under capital became *real*: not only wage work developed, but workers were dispossessed from their knowledge which got incorporated into a complex system of machines and tools – the factory system. Under this paradigm, the separation of manual and intellectual labour constantly deepens (culminating with Taylorism) while scientific knowledge serves to command the collective of workers from outside, tending to reduce them to the status of cogs in a machine. Material labour is largely emptied from any intellectual dimension. It thus appears abstract and interchangeable, comparable to a pure expenditure of energy in a given time. It gets significantly separated from workers’ subjectivity and objectified in a series of precise tasks that are amenable to description and measurement. As simple, manual, and unskilled labour becomes central to production, time become its measure and the main criterion of economic efficiency. In this context, the labour theories of value of Smith, Ricardo or Marx became thinkable and highly plausible⁵⁴. Industrial capitalism is further characterized by the mass production of material goods in large factories based on the principle of economies of scale. Finally, as Carlo Vercellone puts it, “the development of fixed capital presents itself as both the essential object of ownership and the main form of technical progress” (2008).

We can distinguish two phases in the history of industrial capitalism: a long liberal phase extending from the late 18th to the early 20th century and a Fordist phase beginning in the 1930s and vanishing in the mid-1970s (Dockès 2003; Polanyi 1944). The liberal phase saw extreme levels of inequality and a balance of forces unfavourable to labour, whereas the Fordist phase saw a significant reduction of inequalities and a balance of forces relatively favourable to labour. A graphic extracted from Thomas Piketty’s (2019) latest book illustrates well this evolution:

⁵⁴ I will try to remain agnostic concerning the truthfulness of the Marxist labour theory of value, while acknowledging that its plausibility was way higher under industrial capitalism.

Graphique 0.6
Les inégalités de 1900 à 2020 : Europe, États-Unis, Japon



The percentages on the ordinate bar correspond to the share represented by the superior decile (the 10% of the population that earns the highest revenues) within the total share of revenues in different regions (USA, Europe, Japan). It clearly appears that the share of the superior decile is

high (42 to 50%) in each region between 1900 and 1940, corresponding to a situation of high revenue inequality; that this share collapses in the 1940s to remain low (27 to 37%) in each region until 1980; then progressively rises to a significant level today (36 to 48%).

The inversion of the balance of power between labour and capital in the first half of the 20th century is mostly due to a handful of major historical events: the Russian revolution, the 1929 economic crisis, World War II and the cultural hegemony of Marxism in the decades that followed it. A modern welfare state was progressively built in the western bloc – following differentiated paths (Esping-Andersen 1990) – in a socioeconomic context characterized by Taylorism in the organization of labour, Fordism in the wage regime, and Keynesianism in the macroeconomic regulation of society (Hardt & Negri 2000, p. 242). Fordism stands for the higher wages distributed to workers in that period, which paved the way to mass consumption. It partially owes to the peculiar and long-sighted strategy of Henry Ford, but foremost to the power of organized labour in a Cold War context. Keynesianism came out victorious from the post-1929 havoc in the West and became the new economic common sense for decades. In the liberal phase, the central figure of capitalism was the bourgeois entrepreneur, positively portrayed as a conqueror with a taste for risk, play, innovation and speculation. Firms were often family-owned and remained relatively small in comparison to the next period, while capitalist authority was suffused with paternalism and personal subordination. Conversely, gigantic, bureaucratic and centralised industrial firms dominated the Fordist phase (Boltanski & Chiapello 1999, p. 54-59). The central figure of the period is not the individual entrepreneur anymore and not yet the shareholder interested in short-term financial rentability, but the director and managers who wish to serve the expansion and stability of the firm. That context favoured a relative dissociation between capital ownership and control over the firm: directors and managers (the higher bureaucratic levels) controlled the firm with a certain independence from shareholders.

A conjunction of heterogeneous factors (e.g., economic, political, cultural) contributed to the crisis. First, industrial capitalism started to run out of steam as “global manufacturing reached a point of overcapacity and overproduction that put downward pressure on the prices of manufactured goods” (Srnicek 2017, p. 15). Industrial over-production inaugurated a long-lasting (and unfinished) era of decline of profitability in manufacturing. In the aftermath of World War II, the American industry was incontestably leading among the economies of the western bloc. Rapidly though, the German and Japanese industry grew and developed productive capabilities that were able to compete with the one of American firms. The latter’s profitability thus started to diminish in the mid-1960s, setting the stage for the global crisis of the early 1970s. This appeared to many as the realisation of the Marxist law of the falling profit rate. To Marx, this law was “in every respect the most important law of modern political economy” (1857) and the most incontestable evidence that capitalism will eventually have to be overthrown. The law stated that the average profit rate will inevitably decline as a result of the necessary rise of the organic composition of capital, that is the ratio between the capital invested in raw materials and means of production (constant capital⁵⁵) and the capital invested in living labour (variable capital). From a Marxist perspective, raw materials and means of production only conserve or transfer (to products) their value, hence their designation as constant capital. To the contrary, living labour not only reproduces its existing value but produces surplus value, the sole source of profits and rents, hence its designation as variable capital. As industrial capitalism develops, the relative weight of constant capital progressively increases, leading the profit rate to decline. From a non-Marxist perspective, it is also possible to claim that the productivity gains induced by the dynamics of capitalism pose a serious or even an existential threat to its survival in the long-term, in that it entails overproduction, the decline of commodity prices and of the profit rate (e.g., Rifkin 2015). This existential threat appeared in broad daylight in the early 1970s. I contend that cognitive capitalism, in spite of its largely unstable and speculative nature, has partially responded to this problem so that there is no reason to believe this “contradiction” will ever be sufficient to provoke the collapse of capitalism. Again, as Panzieri (1961) put it: “There is no occult, ‘objective’ factor, which, hidden in the development of technology or in the plan of the current capitalist society, guarantees an ‘automatic’ transformation or ‘necessary’ overthrow of existing social relations”.

Second, in a context characterized by the end of the Bretton Woods system (1971’s “Nixon shock”), the oil crisis and the stock market crash of 1973-1974, Western capitalist nations faced an unprecedented phenomenon: stagflation, that is the combination of economic stagnation, high unemployment, and inflation. Stagflation challenged the Keynesian common-sense which dictated economic policies of the period. Hitherto, it suggested to inject money in the economy when unemployment rises, and to withdraw it when inflation does. In the presence of a simultaneous rise of inflation and unemployment, traditional Keynesian recipes could not help, and their theorists were momentarily startled. Neoliberal ideologues seized the opportunity to impose their narrative of the crisis and turn the economic common-sense upside down (Srnicek & Williams 2015).

⁵⁵ Fixed capital = means of production (e.g., machines, tools, factories)
Constant capital = means of production + raw materials

Third, the most fundamental component of the crisis was social and political. There is no need here to give a detailed description of all the events that punctuated the various struggles that shook power relations in the first, second and third world during this period. The political, economic and cultural order of the time was actively contested by revolts that threatened to turn into revolutions. Yet, we must briefly recall the main themes and motivations of these struggles to show how they influenced the restructuring of the capitalist technosystem in the digital age. Boltanski and Chiapello (1999) have argued that, since the early days of capitalism, the motives of indignation against this mode of production have been of four essential types:

- 1) Capitalism as a source of *disenchantment* and *inauthenticity* of objects, people, sentiments, and lifestyles.
- 2) A source of *oppression* hampering the freedom, autonomy and creativity of humans dominated by impersonal market forces or bosses.
- 3) A source of *misery* among workers and unprecedented *inequalities*.
- 4) A source of *opportunism* and *egoism* which dissolves social cohesion and solidarity.

The two sociologists argue that the difficulty to articulate these different motives of indignation in a consistent critical theory led to the development of two main forms of anti-capitalist critique: an artistic critique insisting on the first two motives of indignation and a social critique insisting on the last two motives. The artistic critique mostly corresponds to the ideology of artistic and intellectual avant-gardes, while the social critique is more influent among the working class. The distinction between these two sorts of critique probably grasps a deep truth regarding the history of anti-capitalist movements and their internal tensions. Still, their contradiction should not be exaggerated: many critical theories articulate rather consistently all four motives of indignation, even though they insist more on some than on others. For instance, the focus of Castoriadis' political theory is clearly directed against capitalism as a source of oppression, but it articulates a critique and a positive project that intends to answer all four issues. Similarly, though Marx is without doubt the key author of the social critique, some of his writings (e.g., Marx 1844) are emblems of the artistic critique. Boltanski and Chiapello's book focuses on the French context and argues that the originality of May 68, relatively to prior anti-capitalist movements, is that the artistic critique was as central as the social critique.

This assertion probably holds true for most struggles in western capitalist countries as well as in the sovietic bloc, while a bit less so in the third world – though the artistic critique was not completely absent there (e.g., Cultural Revolution in China). As we have already noted⁵⁶, the critique of bureaucracy, technical domination and alienation were essential components of 1960's radical movements. If the artistic critique had already fought hand in hand with the social critique in some prior movements, it had always been as a minor and more discreet companion. A first reason for the importance of the artistic critique in the 1960s is the Fordist context: economic misery and inequalities were relatively low, directors and managers appeared as the central figures of capitalism and operated with a certain autonomy from shareholders, while bureaucratic management and Taylorism generated growing discontentment among workers. A second reason is that the massification of education and the numerical importance

⁵⁶ See Chapter 1, "Democratic rationalization".

of students in the protests radically contrasted with the small number that intellectuals represented in prior movements. Indeed, the artistic critique was mostly endorsed by students and to some extent by managers, engineers and public administrators in the 1960s, while the discourse of industrial workers mostly focused against economic exploitation and the egoism of a capitalist oligarchy confiscating the fruits of progress. The desires and aspirations of a young and educated generation felt mutilated as they had to enter the job market. While most industrial workers were attached to material security, it was not the main concern of young people anymore:

“The prospect of getting a job that guarantees regular and stable work for eight hours a day, fifty weeks a year, for an entire working life, the prospect of entering the normalized regime of the social factory, which had been a dream for many of their parents, now appeared as a kind of death.” (Hardt et Negri 2000)

Autonomy, creativity, expressivity, imagination, and self-fulfilment were the watchwords of the time. The development and valorisation of knowledge rendered unbearable the acceptance of arbitrary authority. Simultaneously, feminist movements shed light on the political dimension of personal relationships and forced society to re-evaluate the (economic) importance of affective and caring labour traditionally attributed to women. Finally, a significant element of the critique of bureaucracy was directed at the rigid separation between professional and personal life. Our discussion of André Gorz already presented this point⁵⁷. In the heteronomous sphere of work, individuals do not have a say on the aims of the organisation they work for, and these aims are largely unintelligible or hidden from them. The aims proposed to their pursuit are different: the motivation to work is not intrinsic (work is not an end in itself) but extrinsic (work is a means to survival or to compensatory consumption).

According to Boltanski and Chiapello, the dominant class started to give an inefficient and costly response to struggles which was framed in the terms of the social critique (pay raise and other social advantages negotiated with unions), before switching to a more original and efficient response framed in the terms of the artistic critique. This strategic move significantly transformed the organisation of labour, management, and the overall capitalist landscape. I largely agree with this thesis but consider that the sole focus on neo-management is insufficient to summarize the post-1970's capitalist restructuring, as the concepts of neoliberalism and cognitive capitalism also reveal some of its major dimensions. The next sub-sections will analyse neoliberalism, cognitive capitalism, and neo-management as different dimensions of the capitalist reaction to the early 1970s crisis and as central characteristics of the digital age.

⁵⁷ See Chapter 1, “Three perspectives on autonomy in the industrial age”.

Neoliberalism

What is neoliberalism? It is not an inevitable historical development of capital, the logical and necessary result of its progressive penetration in every social spheres. Instead, it is a political ideology that has conquered hegemony and massively succeeded to create a new and contingent organization of capitalism. The term is sometimes used to refer to an era: this only makes sense to the extent that this era (from 1980 up to today) is characterized by the hegemony of the neoliberal ideology and its structuration of the technosystem. It is more than a simple set of economic policies breaking with Keynesianism, a glorification of free-markets or a reactivation of classical liberalism. My conception of neoliberalism is largely in line with the analysis of Foucault (1979), Brown (2003) or Dardot and Laval (2009a), although I prefer defining it as an ideology rather than as a “political rationality” informing a “governmentality” or “art of governing”. These Foucauldian concepts risk to unnecessarily burden our demonstration, while the term “ideology” is perfectly suited for the task as long as we make two precisions. First, this ideology does not simply use the means of the technosystem (administrations, technologies, markets) to reach external ends, but profoundly reshapes those means. Second, it does not simply prescribe state policies but defines a norm of life that pervades and informs society, behaviours and subjectivities.

Dardot and Laval (2009) essentially define neoliberalism by its will to instil the norm of competition between rational economic enterprises in all spheres of life, and list the following as its four essential traits:

- 1) In contrast with the “*laissez-faire*” and human propensity to “truck and barter” (Adam Smith) stressed by classical economic liberalism, neoliberalism does not conceive markets, exchange, or rational economic behaviour as natural. It is an avowed constructivist project reckoning that the existence of markets requires States to set up an adapted and incentivizing legal framework.
- 2) The essence of the market order does not lie in exchange but in competition, defined as a formal game of relations between unequal enterprises. Thus, the State’s fundamental mission is to set up this framework-order based on the constitutive principle of competition and to make sure that it is respected by economic agents.
- 3) The State not only has to construct the market but should itself be constructed according to the norms of market competition and rationality. It must regard itself as an enterprise and be internally organized and regulated by the norm of market competition.
- 4) The norm of competition must model individual conducts and subjectivities. Neoliberalism does not consider humans to be natural homo *economici* but intends to construct them according to this ideal, through normative discourses and institutional practices. The individual is encouraged to relate to himself as an enterprise to manage and a capital to value.

Neoliberalism slowly emerged as a marginal idea when the liberal regulation of capitalism was collapsing in the 1930s. State interventionism was everywhere on the rise: Stalinist Russia was launching its first five-year plans, fascist or authoritarian regimes were rising around Europe, and Keynesianism miraculously saved capitalism in the western world. The belief in self-regulating markets that should be left to their own rule had taken a blow in

the years that followed 1929. In August 1938, the Walter Lippman Colloquium gathered major liberal intellectuals in Paris and constituted a founding moment in the history of neoliberalism. At this conference devoted to the decline of liberalism and its causes, the idea that the *laissez-faire* doctrine should be abandoned since markets are not natural, made a breakthrough. Facing the decline of classical liberalism, these intellectuals started to search a third way between planning and non-intervention. Under the influence of German ordoliberals⁵⁸, they reckoned that the existence of a competitive market order in which processes of capitalist accumulation may be pursued, crucially depends on a legal framework (e.g., property rights, law of contracts, patents, money, banks) which implies juridical interventionism from the State. A central problem in the constitution of classical liberalism in the late 18th century regarded whether the State should intervene or not in certain domains, it was the problem of the potential excess of State interventionism. Governments started to consider that intervening in markets that appeared regulated by complex, spontaneous and natural mechanisms would have counter-productive results, that such interventions would not be illegitimate (a matter of justice) but inefficient (a matter of truth). Liberal political philosophy emerged alongside (as both an effect and a cause of) this new art of governing, approaching it in normative terms that would promote its implications for the establishment of negative freedom⁵⁹ (Berlin 1959). For neoliberals, the question is not whether to intervene, but *how* to intervene. The form of intervention they privilege is juridical: Walter Eucken argues we should develop a “conscious economic law” (quoted in Foucault 1979, p. 172), that is, rationally design and adapt the best possible legal framework. This framework is supposed to introduce the rule of law in the economic order, which would represent the opposite of central planning:

“Under the first the government confines itself to fixing rules determining the conditions under which the available resources may be used, leaving to the individuals the decision for what ends they are to be used. Under the second the government directs the use of the means of production to particular ends” (Hayek 1944, p. 76).

In classical liberalism, markets are mainly defined by the principle of exchange: partners exchange commodities and establish the right equivalence as long as the State does not interfere. For neoliberalism, markets are essentially characterized by competition instead of exchange. Competition is not a natural game driven by instincts, it is an *eidōs*/essence, it is a formal game between unequal players whose internal logic produces positive effects. On this base, economic theory is meant to analyse in the abstract, the formal mechanisms of competition and their logical effects, while history is meant to describe the concrete societies in which these formal processes are realised.

Moreover, the concern of neoliberalism is not to leave a free space for market exchange within a state-governed society, as it was the case for liberalism in the late 18th century. Instead, the issue for neoliberalism is whether the formal principles of a market economy can be used to

⁵⁸ Hayek also believed that a certain form of State interventionism is necessary to sustain markets. Still, he did not consider the market order to be either artificial or natural, he conceived it as spontaneous, which means it results from human action but not from a conscious design. However, the ordoliberal view had more historical influence on the actual neoliberal restructuring of capitalism than Hayek’s cultural evolutionism.

⁵⁹ “Political liberty in this sense is simply the area within which a man can act unobstructed by others”, as Isaiah Berlin puts it.

regulate and organise the State: “In other words, [to have] a State under market surveillance rather than a market under State surveillance” (Foucault, 1979 p. 120). Firstly, this means that the State responds to the needs of the market and shapes society according to these needs by intervening on non-economic parameters which form the environment of the economic game: for instance, education is transformed according to the needs of the job market and conceived as a means to get a job rather than an end in itself. The State’s legitimacy is essentially tied to its ability to foster economic growth by guaranteeing the framework for economic liberty. Secondly, “the state must not simply concern itself with the market but think and behave like a market actor across all of its functions, including law” (Brown 2003). Managerial methods coming from the private sector are imported in public administrations (the so-called *new public management*), while the notion of “public services” gets dissolved by requirements of efficiency, productivity, and wherever possible, profitability. Political discourse on all matters gets framed in entrepreneurial terms and it becomes common to hear heads of States compare their task with managing a company. Thirdly, the market order constructed by States is meant to develop beyond their reach and constrain their action, so that the instability of politics cannot easily affect the rules of the game and prejudice the players (capitalist investors first of all). The free circulation of capital and commodities hardened in international treaties and multilateral institutions (e.g., WTO) encourages States to shape their society according to the requirement of competitiveness, to attract investors by arranging the best conditions for capital (e.g., reduction of social and environmental standards, low fiscality). It also pushes forward the international division of labour by promoting a specialisation on competitive, export-oriented sectors. Furthermore, not only monetary policies are designed to privilege price stability (limiting inflation) over any other goals (e.g., full employment) but “similarly to the competitive order, they should function as automatically as possible” (Walter Eucken 1952, quoted in Denord et al. 2015): central banks should be independent from political interference. Finally, central banks are not allowed to fund States directly (on the so-called primary market), forcing them to finance their deficits by emitting bonds on financial markets (also referred to as the secondary market), which will survey and discipline their budgetary policies by threatening to increase their interest rates (through massive bond sales or more complex speculative schemes). In short, the neoliberal State must be lean but also strong: not to counter-balance the violence of the market with democratically elaborated orientations, but to discipline society according to the imperatives of the international market order.

Neoliberalism also has a properly anthropological dimension: it aims to construct man as a homo economicus, understood as a rational enterprise evolving in a competitive environment. Market rationality and competition are suffused within all spheres of social life to become ubiquitous. Men are not considered as natural homo economici, they must be constructed as such through institutional practices (rewards, incentives) and discourses that nudge their behaviour and model their subjectivity. If all individual conducts are not considered as purely economic, most have an economic dimension – in so far as they must allocate rare resources to alternative ends – which makes them interpretable and governable in economic terms. Gary Becker (1968) for instance has famously interpreted criminality in economic terms. The criminal invests in an action from which he expects a profit while risking a loss. Thus, criminal law should aim to limit the crime offer by developing a negative demand, the cost of which

should not exceed the one of the criminality it seeks to reduce. Such analysis does not claim to grasp the full meaning of crime in all its dimensions, but only to seize an important dimension of it, through which the subject can be governed, since he will react to incentives modifying his cost/benefit calculations: “The neoliberal citizen is calculating rather than rule abiding, a Benthamite rather than a Hobbesian” (Brown 2003). Neoliberalism extends the norm of market rationality and competition beyond the market sphere: quantitative evaluations are systematically developed in public and private administrations to create “quasi-markets” which encourage market rationality where no commodities are exchanged (Dardot et Laval 2010). The opposition between labour and capital is rhetorically dissolved: the worker is portrayed as a self-entrepreneur producing himself as a human capital and selling his services on a market. Every revenue consists in a retribution for an invested capital and the wage is the retribution for the self-entrepreneur’s investment of his human capital. Neoliberalism has redefined the homo economicus, not as the partner of commodity exchange he used to be in classical liberalism, but as the entrepreneur of himself (Foucault 1979, p. 232). Even the consumer is portrayed as a producer by Gary Becker: he produces his own satisfaction. Thus, the neoliberal subject understands himself as a self-entrepreneur not only in the sphere of wage work, but in every social sphere: he rationally produces and values his own human capital. The universalisation of market rationality blurs the opposition between work and leisure, technosystem and lifeworld, instrumental and communicative rationality, and more generally, the differentiation between social spheres (e.g., morality, family, work, politics) that used to be regulated by heterogeneous normative principles. According to Wendy Brown, this relative autonomy of social institutions from one another and from the market was the cornerstone of liberal democracies: “what liberal democracy has provided over the past two centuries is a modest ethical gap between economy and polity” (2003). Liberal democracy encodes, reflects and legitimates capitalist social relations, but simultaneously resists, counters and tempers them by leaving a space for the expression of political, moral and subjective claims located outside market rationality. By extending economic calculation to every aspect of social and political life, neoliberalism is destroying liberal democracies she argues.

Neoliberalism proved to be a flexible ideology able to adapt to a wide variety of contexts: from Germany in the late 1940s to the current European Union and United States, going through Chile in the 1970s or post-Hussein Iraq in the 2000s. As it tends to favour social dissolution, it has often been practiced in a peculiar complementarity with conservative or reactionary ideologies: in the US of George W. Bush (Brown 2006) or the Turkey of Recep Tayyip Erdogan for instance. In the mid of Keynesian dominance, high growth, and full employment, it developed as a fringe theory and could not even convince capitalists that its adoption was in the best of their interest (Srnicek and Williams 2015, p. 55). Neoliberals knew they could not win in such a context. They developed a long-term strategy of cultural hegemony based on elite reflection and mass communication, developing a network of associations (e.g., the Mont Pelerin Society) and think tanks (e.g., Manhattan Institute for Policy Research, Fraser Institute, Institute of Economic Affairs), to progressively infiltrate the media, academia, and policy world, while waiting for the next crisis to come. As Milton Friedman famously put it (2002, p. xiv):

“Only a crisis – actual or perceived – produces real change. When that crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable.”

Neoliberalism imposed itself as a response to the 1970s crisis, when the capitalist class desperately wanted to take back control, re-assert its power over labour, restore profitability and solve the issue of stagflation. Neoliberals had argued for decades already that inflation and unemployment was the necessary outcome of price and wage rigidities supported by union power and the welfare state. They had a plausible interpretation of the crisis and ready to use policy proposals to offer to governments when Keynesians were momentarily disconcerted. The priority was given to the fight against inflation rather than unemployment, the latter was sometimes even consciously encouraged to discipline labour (as Thatcher’s chief economic advisor eventually confessed⁶⁰).

Neoliberalism deployed a handful of means to restore profitability: a global attack against labour to reduce wages or at least their share in the added value, a liberation of finance capital favouring speculation and subordinating management to the objective of short-term financial valorisation, new profit opportunities opened by privatisation, new or reinforced property rights (especially intellectual property rights)⁶¹ and facilitated investments in foreign countries. Competition between “self-entrepreneurs” has been exacerbated at every level: between workers of a same country as their ability to organize collectively was undermined, between workers and unemployed within a same country, and perhaps more significantly, between workers of different nations as the mobility of finance capital put them under the constant threat of relocation. The political unity of wage work has been methodically broken: trade unions faced new legal hurdles, statuses and contract types were multiplied, employees and subcontractors were led to work in the same plants, employees were encouraged to buy share of their companies to be objectively interested in financial rentability and subjectively adopt the perspective of capital, not to speak of private pension funds which massified this trend etc.

Outsourcing, that is subcontracting several tasks to smaller companies or independent workers that can be put in competition and laid off at any time – rather than integrating them within the company on a stable basis – became generalized. It amounts to replacing a bureaucratic coordination of labour by a market-based coordination. Contrarily to the putting-out system that existed under mercantile capitalism (in which labour was only formally subsumed under capital), contemporary outsourcing schemes often afford a much better control of capital over the duration and intensity of labour, as well as on the quality of its products. The rise of workfare (forcing unemployed people to work in order to receive benefits) and the increased surveillance

⁶⁰ Alan Budd declared: “The 1980s policies of attacking inflation by squeezing the economy and public spending were a cover to bash the workers. Raising unemployment was a very desirable way of reducing the strength of the working class. What was engineered-in Marxist terms-was a crisis of capitalism, which re-created a reserve army of labour, and has allowed the capitalists to make high profits ever since” (The Observer 1992 quoted in Harvey 2010, p. 284).

⁶¹ The neoliberal trend towards privatisation and new property rights will be discussed again throughout this chapter, especially in the last part (“Genealogy of the commons discourse”) which will address the concept of “enclosure”.

and control of unemployed populations, has so deeply transformed welfare institutions that it can now be argued (at least in the highly neoliberalized British context) that: “the welfare state is becoming little more than an institution designed to deploy the surplus [population] against the working class” (Srnicek & Williams 2015, p. 101).

Simultaneously, the neoliberal discourse concealed social structures of inequality and domination by insisting that the individual bears full responsibility for the consequences of his or her action regardless of the context: “There’s no such thing as society” as Thatcher declared (Keay 1987), echoing Hayek. The model neoliberal citizen is fully depoliticized, he is “one who strategizes for her- or himself among various social, political, and economic options, not one who strives with others to alter or organize these options” (Brown 2003). The withdrawal of the state from certain domains and privatisation of some state functions, may be interpreted (from a Foucauldian perspective) not as a dismantling of government but as a method of government: neoliberal subjects are controlled through their freedom. Flexibility (the positive term for “precariousness”) represents the neoliberal response to the 1960’s call for autonomy. While it joyfully crushed the material security obtained through more than a century of struggles by the social critique, capital pretended to respond to the artistic critique through a new managerial discourse promoting “networks”, “horizontality”, “authenticity”, “creativity”, and “autonomy”. The rigid separation between professional and personal life got cracked by the figure of the self-entrepreneur who rationally produces and values his own human capital in every sphere. Wage work would amount to selling a service and gain value by becoming more employable. Self-fulfilment in work, from a demand of workers to capital, was reversed into a demand from capital to workers:

“You should feel free and enthusiast to serve my interests, you should fully align your desires on my own and enrol your subjectivity at my service”.

That is the implicit demand of capital in the digital age.

Cognitive capitalism

Cognitive capitalism can be defined as a third historical system of accumulation in which “the intellectual and cognitive dimension of labour becomes dominant and the central stake of capital valorisation and forms of ownership directly regards the transformation of knowledge into a fictive commodity” (Vercellone 2008). The concept of cognitive capitalism has been developed since the early 2000s by a group of authors (including Antonio Negri, Michael Hardt, Carlo Vercellone, Yann Moulier-Boutang, Enzo Rullani⁶²), whose analysis share essential traits and who can be labelled post-operaists (or post-workerists) as they have been inspired by or affiliated to “Operaismo” – an heterodox current of Marxism central to the Italian New Left of the 1960s/1970s. I will keep the concept of cognitive capitalism but distance myself from the central claim of post-operaism: namely, that immaterial labour is becoming increasingly autonomous and tends to self-organize spontaneously, while capital does not organize nor subsume it really (but only formally) and becomes increasingly parasitic.

Two centuries of technological development under industrial capitalism have massively increased labour productivity and decreased the marginal production costs⁶³ of material products, which determined commodity prices and profit rates. The subsequent system of accumulation – cognitive capitalism – is essentially characterized by the fact that immaterial labour now prevails over material labour in processes of capitalist valorisation. Immaterial labour consists in labour “that produces an immaterial good, such as a service, a cultural product, knowledge, or communication” (Hardt & Negri 2000, p. 290). Thus, the exchange value of a product now depends more on its symbolic, esthetical, and social value than on its material reality:

“When a pair of trainers costs €4 or €5 to make and €2 or €3 to transport, but is then sold between €20 and €300 depending on whether it is branded Nike or Adidas, we can say that most of the exchange value or market value derives from the value of the brand, and thus from a factor which is immaterial and intangible.” (Moulier-Boutang, 2011, p. 32)

The industrial production of material goods clearly does not disappear or even decrease. It simply loses its centrality in the formation of economic value and gets profoundly re-moulded under cognitive capitalism. Immaterial labour represents a minority portion of global labour and remains concentrated in the dominant regions of the world economy, but it has become qualitatively hegemonic and guides the transformation of other sectors. Similarly, industrial labour only represented a small fraction of global (or even English) labour when Marx and Engels were writing the Communist Manifesto, but this fraction was quantitatively growing and qualitatively hegemonic. Industrial capitalism privileged competition through prices: firms competed to sell comparable products at the lowest possible price by reducing their production

⁶² André Gorz also contributed to this theorization of cognitive capitalism but cannot be properly classified under the label of “post-operaism”. He has been strongly influenced by this intellectual tradition, conversed with its members and eventually converged with some of their views, but did not really belong to it.

⁶³ The marginal cost is defined as the additional cost incurred in the production of one more unit of a good or service. A company seeking to maximize its profits will produce up to the point where marginal cost equals marginal revenue. Competition between firms on an efficient market is meant to drive the price of commodities down to their marginal production cost. If this marginal cost is zero, the prices should be zero as well.

costs. With cognitive capitalism, competition through innovation comes to the fore: commodities should appear new, personalized, incommensurable, and incorporate protected information (e.g., brands, copyright, patents) to be sold above their marginal production costs. Competition through innovation does not replace competition through prices, it re-arranges and completes it. In many sectors, the Taylorian division of labour is also replaced or supplemented by a cognitive division of labour. The former was based on the reduction of complex into simple work, the rigid separation between conception and execution, and a logic of specialised mass production and economies of scale. The latter is based on the knowledge and polyvalence of a workforce that is required to constantly learn, adapt, and innovate in a context of uncertain demand and small series production. Furthermore, cognitive capitalism is characterized by the rising importance of immaterial or intangible assets (e.g., brands, logos, patents, copyrights, franchising, data, human capital, customer relationships), which tend to replace material assets (e.g., machines, factories, shops) as the main object of ownership and source of competitiveness for firms (Vercellone 2008).

The tertiarization of the most advanced capitalist countries means that production increasingly consists in the production of man by man. Production increasingly appears to be “biopolitical” (Hardt & Negri 2009): rather than producing objects to be bought by subjects, it fundamentally aims to produce subjectivity itself, to produce social relations and forms of life. Services comprise a wide range of activities – from education, health care and transportation to finance, entertainment and advertising – which require flexible skills in which knowledge, information, affect, and communication play a central role. Immaterial labour essentially consists in cognitive or affective labour, in the manipulation of symbols or the manipulation of affects. Production tends to be more and more based on “the cooperative labour of human brains joined together in networks by means of computer” rather than on “the mechanical transformation of matter by means of a twin expenditure of energy and labour power” (Moulier-Boutang 2011, p. 57). Cognitive labour mostly consists in computer-based communication, information treatment and manipulation of symbols. It includes both high-skilled, high-paying jobs involving creative and intelligent symbol manipulation and low-skilled, low-paid jobs involving routine symbol manipulation, such as data entry and word processing. Computers are central to immaterial (and especially cognitive) labour but also transform production and society as a whole:

“In an earlier era, workers learned how to act like machines both inside and outside the factory. We even learned (with the help of Muybridge’s photos, for example) to recognize human activity in general as mechanical. Today we increasingly think like computers, while communication technologies and their model of interaction are becoming more and more central to labouring activities.” (Hardt & Negri 2000, p. 291)

A major characteristic of computers is that their operations can be modified and reconfigured based on their interaction with users and their environment. This interactive paradigm is central to the digital age and has come to influence and alter a wide range of productive activities. In the manufacturing sector for example, Toyotism represents a radical break from Fordism in the communication it establishes between production (the factory) and consumption (the market). While the mass production of standardized goods could count on a stable and massive demand

in the Fordist era, the uncertainty of demand in the subsequent period encouraged the development of a feedback loop from consumption to production. In the Toyotist model, production planning constantly communicates with consumer markets and – in principle – the decision to produce follows the assessment of present consumer demand. This model has been radically pushed forward in the last decades with the rising role of data and platform companies (e.g., Google, Facebook, Uber, Amazon). Affective labour – the other part of immaterial labour – is concerned with the manipulation of affects and heavily relies on human contact and interaction, though this interaction may be virtual. Health services and education are based on caring and affective labour, while the entertainment business also consists in the manipulation of affect. These activities may be profoundly corporeal, but they represent an immaterial labour in that they are meant to produce an intangible result, such as wellbeing, excitement, passion, or ease.

In what respect may cognitive capitalism appear as a response to the early 1970s crisis? The artistic critique of the 1960s was fed by the refusal of industrial labour and authoritarian-management by a young generation of educated students who valued knowledge and creativity, while the social critique expressed very demanding claims over the redistribution of added value to workers. The capitalist response was to progressively transfer most industries to less developed countries (with lower pay and social standards), while developing services and immaterial labour in the most advanced countries. The automation and informatisation of the manufacturing sector also served to cut the workforce and to bring material labour closer to immaterial labour. Cognitive labour (especially in its high-skilled version) requests knowledge, creativity and imagination. The welfare state's educational institutions set up during the Fordist phase developed a mass intellectuality (a higher level of education within society) which stimulated the rise of cognitive capitalism. Mass intellectuality is essential to cognitive capitalism since "it is knowledge that governs the processing of information, an information which would otherwise remain sterile, just as capital would be without labour" (Vercellone 2008). Its importance in the emergence of cognitive capitalism also demonstrates that the latter cannot be reduced to a necessary outcome of the development and spread of digital technologies. Furthermore, cognitive labour contributes to soften the separation between professional and personal life. Contrarily to industrial machines, work-related thought and ideas cannot be left at the office. They follow employees at home and suffuse society.

Feminist movements of the 1960s revolted against the unequal distribution of unpaid domestic chores and highlighted their centrality to the reproduction of labour-power – hence to the reproduction of the whole capitalist economy (Federici 2018). In the following decades, women massively entered the labour market while countless activities that they previously took in charge gratuitously in the domestic sphere were turned into commodified services (cooking, cleaning, childcare). Affective, emotional, and relational qualities that are traditionally associated with women's domestic tasks became central to nearly all labouring practices. The separation between productive labour (that generates value, commodities and profit) and reproductive labour (that reproduces worker in the domestic sphere) got increasingly blurred as capitalism took in charge more and more reproductive activities which used to be undertaken for free in the household. While material labour used to be largely separated from the workers' subjectivity and objectified in a precise series of tasks, immaterial labour requires the subjective

implication of workers – it mobilises subjectivity to produce subjectivity. On the one hand, cognitive labour engages the inner thoughts of workers during and after office hours and is harder to break down into standard and measurable tasks. On the other hand, affective labour enrolls the worker's relational and emotional skills and requires him to be (or at least appear to be) sincere and disinterested – intrinsically motivated rather than extrinsically motivated by the prospect of money. For instance, receptionists or hostesses are expected to smile and act kindly to customers in a way that appear to transcend work purpose. For this reason, the control over workers' subjectivity has become a major concern for capital in the digital age. Finally, the diversification and personalisation of goods and services characterizing cognitive capitalism contrasts with the mass production of standardized commodities under industrial capitalism, echoing the artistic critique of the inauthenticity of the industrial world and the 1960s cultural aspirations for the individual expression of singularity and creativity.

Post-operaist authors consider that there is a fundamental contradiction between immaterial labour and capitalist relations of production, which implies that the development of the former pushes toward the surpassing of the latter. Their thesis adapts the Marxist historical narrative and analysis of the contradiction between the development of productive forces and relations of production to the context of a capitalist economy based on knowledge⁶⁴. Curiously though, it theorizes the capitalist exploitation of immaterial labour in a way that is closer to Proudhon than to Marx (Dardot et Laval 2015). Against post-operaism, I will argue (in the next sub-section) that immaterial labour does not fundamentally contradict capitalist relations of production, but simply forces their transformation and re-adaptation. To a large extent, this re-adaptation has already been achieved successfully.

Post-operaist authors claim that immaterial or biopolitical labour tends to self-organize autonomously, while capital captures *a posteriori* the value it has created. The capitalist control over labour would have regressed from *real* to *formal* subsumption. Under industrial capitalism, workers were dispossessed from their knowledge and control over the productive process, their cooperation was organized from outside by capital, represented by its managerial organisation and machinery. Labour was really subsumed under capital. Under cognitive capitalism, capital cannot organize and control from outside the cooperation of biopolitical labour. It is forced to grant more autonomy to workers because the nature of immaterial labour renders external control inefficient and counter-productive:

“With reference to large-scale industry, Marx recognizes that the essential role of the capitalist in the production process, which is clearly linked to the mechanisms of exploitation, is to provide cooperation, that is, bring workers together in the factory, give them the tools to work together, furnish a plan to cooperate, and enforce their cooperation. The capitalist ensures cooperation, Marx imagines, like the general on the battlefield or the conductor of the orchestra. In biopolitical production, however, capital does not determine the cooperative arrangement, or at least not to the same extent. Cognitive labor and affective labor generally produce cooperation

⁶⁴ See Chapter 3, The Common(s) as a mode of production, The revolutionary perspective of Hardt & Negri

autonomously from capitalist command, even in some of the most constrained and exploited circumstances, such as call centers or food services. Intellectual, communicative, and affective means of cooperation are generally created in the productive encounters themselves and cannot be directed from the outside.” (Hardt et Negri 2009, p. 140)

From this perspective, since capital does not organize the productive cooperation of workers anymore, exploitation appears as parasitism and theft. In that, the post-operaist understanding of exploitation is in line with Proudhon rather than Marx. Yet, it upholds Marx’s historical optimism. Indeed, immaterial labour “seems to provide the potential for a kind of spontaneous and elementary communism” (Hardt & Negri 2000, p. 294). The alleged regression of capitalist control over immaterial labour suggest that the latter could initiate an “exodus” (Hardt & Negri 2009) to fully escape from the former’s realm.

Post-operaists often distinguish knowledge from information. Information refers to intellectual contents that can be objectified, formalised and separated from subjects (e.g., data, intellectually protected content). Knowledge refers to the intellectual and relational capabilities of subjects as they act, create and cooperate; it cannot be separated from them. Cognitive capitalism would essentially be based on the valorisation of knowledge and represent “a new hegemony of living knowledge, incorporated in and mobilised by labour, rather than formalised information incorporated in fixed capital and the managerial organisation of firms” (Vercellone 2008). Living labour (as opposed to dead labour, that is fixed capital) in the form of knowledge would have become more central to production than before. Cognitive capitalism would be characterized by the new “centrality of a living labour that is not consumed and reduced to dead labour” (Moulier-Boutang, 2011, p. 54). The increasing use of expressions such as “immaterial capital” or “intellectual capital” in mainstream economic discourse is seen as a symptom of this new hegemony of living labour. The argument is that immaterial capital mostly consists in the cognitive and creative capabilities of the biopolitical workforce and thus remains in the possession of workers. The value of firms would essentially lie in the subjectivity of their workers rather than in the fixed capital (be it machines or patents) they own. In this situation, capital would be particularly vulnerable to a form of workers’ exodus.

In addition, knowledge is produced in society at large through a wide process of collaboration between individuals that extends far beyond their working time. Biopolitical production would thus “*precede and exceed* the market sphere” (Broca 2012, P. 244). It would be achieved in society, upstream from the market. Production is not only described as “biopolitical” because it aims to produce society and subjectivity, but also because it spontaneously results from the interaction of subjects within society. Yann Moulier-Boutang proposes two different metaphors to illustrate the anteriority of social production over capitalist valorisation. The first is that the market economy only represents “the tip of the iceberg”: it would rely on a much larger non-market economy consisting in all social interactions (Moulier-Boutang 2009, quoted in Broca 2012, p. 244). The second metaphor is the one of pollination. Every individual produces positive externalities by participating to social life. In that, individuals would be like bees pollinating the market economy and creating the condition for the realisation of exchange values by enterprises (Moulier-Boutang 2011).

The rise of immaterial labour would contradict capitalist relations of production at three main levels: intellectual property rights, the institution of wage labour, the measure of labour and its outputs (Broca 2013, p. 321-326).

Since the 1980's, intellectual property rights were strengthened and made more exclusive by law⁶⁵ in a context where the transition to cognitive capitalism rendered immaterial assets increasingly strategic. Intellectual property rights represents one of the main way that capital has found to commodify knowledge: they create artificial barriers to the circulation of information which makes it scarce and supports its market price. However, the obstruction of the free flow of information and knowledge hampers the process of social collaboration underlying biopolitical production. Capital misunderstands the resource it attempts to exploit (knowledge) and risks to kill the goose that lays the golden eggs. According to post-operaists, information and knowledge are meant to be shared as commons since their intrinsic characteristics (non-rivalry and non-exclusiveness) tend to resist commodification. Their argument is in line with the hacker promotion of the free circulation of information and its associated slogan: "Information wants to be free"⁶⁶.

The second contradiction regards the inadaptation of the regime of wage labour to biopolitical production. Since immaterial labour is irregular, discontinuous and extends on all living-time, it becomes problematic to reward it according to the hours spent in office. The institution of wage labour turns into an instrument of predation of externalities as it enables companies to benefit from a labour accomplished outside of their realm. The double separation of workers from their means of production and from their product, which constitutes the core of the wage labour regime, is called into question. On the one hand, the fixed capital required by immaterial labour is often limited to a personal computer and an internet access – two resources that are now widely distributed within developed societies. On the other hand, creative and intellectual workers do not easily give up claims of ownership over their products on the grounds that they receive a wage. Moreover, we have seen that the productivity of immaterial labour is hampered by strict managerial commands.

The third contradiction comes from the difficulty to measure immaterial labour and its outputs. The quantification of wage workers' individual contributions to production would become increasingly difficult since the latter is collaborative and realised in society at large. Since that quantification supports wage differences, legitimates social hierarchies, and give a grip to managerial control it is crucial to capitalist relations of production. More importantly, the products of immaterial labour also tend to defy quantification, which leads to a crisis of the Marxist law of value. These products can be very expensive to create and have no reproduction costs. Their exchange value is not related to the fixed capital and the labour-time (the dead and living labour) they require to be produced. It rather depends on their subjective desirability, which is stimulated by marketing and advertising. And since these outputs essentially consist

⁶⁵ See Chapter 2, "Neoliberal enclosures and accumulation by dispossession".

⁶⁶ The origin of this phrase is usually attributed to Stewart Brand.

in social relations and forms of life, their actual value tends to exceed their exchange value, to resist quantitative measures⁶⁷ and trespass the boundaries of private property.

In the next sub-section (“Neo-management”), I will present arguments against the post-operaist analysis of cognitive capitalism. A further critique of Michael Hardt and Antonio Negri’s political philosophy will be developed in Chapter 3 (see sub-section “The revolutionary perspective: Michael Hardt & Antonio Negri”).

⁶⁷ We have seen that according to Andrew Feenberg (2017), commodification implies standardization. When post-operaist authors argue that the products of immaterial labour are incommensurable qualities that resist quantification, their argument could be phrased in Feenberg’s terminology as follows: these products cannot be commodified because they cannot be standardized.

Neo-management

Neo-management refers to a set of new managerial practices and discourses that have emerged after the 1970s (more visibly since the 1990s) and notably differ from the habits of the previous period. Neo-management articulates neoliberalism and cognitive capitalism in a new approach to the control of the workforce. Neoliberalism as a hegemonic ideology and cognitive capitalism as a historical system of accumulation are conceptually distinct, but empirically convergent inasmuch as they describe the form taken by capitalist economies and societies since the last fourth of the 20th century. Approaching today's social world mainly through one concept or the other may lead to divergent analyses or to the overestimation of the explanatory power of the concept we insist on. The post-operaist authors who developed the notion of cognitive capitalism approach neo-management as a result of this system of accumulation and consider that it represents an increase in workers' autonomy and a regression of capitalist control. On the contrary, authors who approach the current economy in terms of neoliberalism (Dardot et Laval 2010a; Lordon 2010) tend to see neo-management as an instantiation of this ideology and consider that capitalist control over labour has become more invasive, intense or even "totalitarian"⁶⁸. Boltanski and Chiapello's position leans towards the thinkers of neoliberalism in their assessment of workers' autonomy and capitalist control but remains more moderate. Yet, they neglect the concept of neoliberalism and argue that the evolutions of management cannot be simply interpreted as a reinforcement of economic liberalism.

In line with the thinkers of neoliberalism, I argue that capitalist control over labour has indeed progressed. Against them however, I argue that neo-management cannot be fully reduced to neoliberalism since it also owes some of its characteristics to cognitive capitalism.

Management is the equivalent in the control of labour ("human resources"), of technology and engineering in the control of nature. Initially, the discipline solely focused on the organisation of labour within the firm. Progressively though, it has widened its interests and diversified in multiple sub-disciplines concerned with the firm's environment: entrepreneurial strategy aims to master markets and competition, marketing focuses on distribution and customers, public relations focuses on press and political authorities etc. Still, in its core, management can still be defined in Marxist terms as a science aiming to extract the highest possible amount of labour out of the force of labour (that is, the ability to work): when a firm pays to rent the labour-force of a hundred men for a day, management has to mobilise them as intensively and productively as possible to serve the interests of the firm's owners. In the context of capitalist relations of production, there is a major gap between the interests and desires of capital on the one hand and labour on the other. Since workers will have no right over the products of their labour, they have no reason to work as actively and efficiently as they can. The role of management is to mobilise them as much as possible at the service of capital. Throughout history, the forms of control and mobilisation of the workforce have changed in relation with the level of economic development, the balance of power between capital and labour, the sociological characteristics of workers, the organisation of production and a variety

⁶⁸ This term is used by Frédéric Lordon to describe the ambition of the neoliberal enterprise to "totally" reshape workers' subjectivity and align their desires on its own. This sense explicitly differs from the traditional meaning of "totalitarianism" in political science.

of other factors. The first two historical modes of motivation of workers were extrinsic as we have seen: wage work was simply a means to survival in the liberal phase, then it also became a means to compensatory consumption in the Fordist phase as mass production had to be absorbed by mass consumption. Under industrial capitalism, management complemented these motivations with numerous methods of constraints and surveillance enforced by hierarchy and machinery to discipline bodies and subdue spirits. The novelty of neo-management consists in proposing a third historical mode of motivation which is intrinsic: work should be seen as desirable and meaningful, as an occasion for the self-fulfilment of individuals and the expression of their singularity.

Enterprises now target the desires and subjectivity of their employees and attempt to mould them according to their objectives. Neo-management aims to move from the control of workers to the obtention of their self-control, which requires to “shift the constraint from the exteriority of apparatuses to the interiority of persons” (Boltanski et Chiapello 1999, p. 135). From this perspective, Taylorism looks quite rudimentary since it tries to reify men by reducing them to cogs or machines while neo-management intends to “instrumentalise them in their properly human characteristics” (Boltanski et Chiapello 1999, p. 164), to put their affects, morality, and inventiveness at the service of profit-maximization. Three reasons can explain this novelty: the first has to do with neoliberalism, the second with cognitive capitalism, and the third with the 1960’s/1970’s crisis. Following Lordon, “if [capitalism] changes its method, it is first of all because it changes its ambition” (Lordon 2010, p. 57). By empowering finance capital and intensifying market competition, neoliberalism radically transformed the balance of power between capital and labour in favour of the former. Consequently, capital has become greedier and is able to demand more from workers, to push further its phantasm of perfectly aligning their desires on his own. Regarding cognitive capitalism, immaterial labour demands a greater subjective implication from workers. And since it rarely can be objectified in a precise list of tasks, it became sensible for management to go upstream from workers’ actions, to try and shape the desires and dispositions that drive these actions. Finally, neo-management proposes a capitalist response to the artistic critique of the 1960’s which promoted autonomy against hierarchy and hoped to radically transform industrial societies to make work creative and fulfilling.

In a context characterized by slow economic growth, harsh competition at every level, the mass diffusion of information and communication technologies, and the cultural rejection of hierarchy, firms had to revise their organisation and became obsessed with becoming “flexible”, “adaptable”, and “resilient”⁶⁹. The solutions proposed by management scholars revolved around a handful of key ideas: “*lean* enterprises working in *network* with a multitude of collaborators, the organisation of labour in teams, or by *projects*, oriented towards customer satisfaction, and the general mobilisation of workers thanks to the *visions* of their leaders” (Boltanski et Chiapello 1999, p. 124). Companies are encouraged to suppress several hierarchical levels and to focus only on their core business while outsourcing many tasks and

⁶⁹ The widespread use of terms such as “resilience” or “ecosystem” in managerial discourse seems even more recent than the watchwords of “flexibility” and “adaptability”. Not only these terms provide useful metaphors for organisational design, but they help to disarm the environmental critique of capitalism by absorbing some of its vocabulary.

functions: “the typical image of a modern company today is a slim core surrounded with a nebula of furnishers, subcontractors, service providers, temporary workers whose amount vary according to economic activity, and partner enterprises” (Boltanski et Chiapello 1999, p. 125). Such companies are said to work in network. Employees and teams are given more leeway in the organisation of their work: rather than being prescribed a detailed list of tasks, they are given objectives to fulfil by their own means. The organisation of labour in teams allows a better social inclusion of workers within the firm. They can have the impression of working for a human-scaled structure rather than a bureaucratic colossus. Managers should not appear as hierarchical chiefs anymore, imposing their arbitrary power on their subordinates, giving orders or transmitting instructions coming from above. Still, they need to coordinate workers and teams in consistency with the objectives of directors. They are depicted as team “leaders” or “catalysts” who mobilise the energies of their “collaborators” (subordinates) thanks to their “vision”. They must inspire their team, impose their authority through their skills and charisma rather than their hierarchical status. In Weberian terms, we may say that neo-management values and prioritizes charismatic authority over rational-legal authority (Weber 1921). Neo-management promotes the values and culture of the enterprise, the visions of its leaders, the dream of its founders and so on, in a way that has no equivalent in Taylorism. In does so in the hope to mobilise subjectively employees and coordinate their actions. Gilles Deleuze has pointed out this evolution in a striking phrase:

“We are taught that corporations have a soul, which really is the most terrifying news in the world” (Deleuze 1990).

Today’s leading tech companies perfectly illustrate this trend as they commonly display humanitarian aspirations or moral values. To take only two examples, Google’s motto used to be “Don’t be evil” and Mark Zuckerberg (Facebook’s CEO and founder) recently wrote a short manifesto entitled “Building Global Community” (Zuckerberg 2017).

The notions of “network” and “projects” are central to neo-management and structure a new and consistent system of values (Boltanski et Chiapello 1999)⁷⁰. Until the 1980’s the term “network” mostly referred to large technological systems (e.g., electricity, water, railroads) or secret organisations which were most often negatively connotated (e.g., mafias). The organisational paradigm of “networks” sounded suspect within enterprises. It had an unofficial, clandestine and subversive connotation that contrasted with the official hierarchy. The rehabilitation and surge of the theme of networks⁷¹ is essentially due to the diffusion and cultural influence of ICTs and, to a lesser extent, to a variety of sociological works (including the ones of the actor-network theory). Networks are not new in themselves. What is new is the fact that “the act of mediating, the art of weaving and using the most diverse and remote links, gets autonomized, detached from other activities that used to cover it, identified and valued in itself” (Boltanski et Chiapello 1999, p. 176). Twenty years after the publication of this book, it is now striking how this “art of weaving”, of mediating the interactions of different groups, has become

⁷⁰ A “Cité” in Boltanski and Chiapello’s terminology.

⁷¹ A quick search of the frequency of use of the term “networks” in published books registered by Google in its “Ngram Viewer”, shows that it has skyrocketed since the 1980’s up to 2000, to remain stable afterwards: https://books.google.com/ngrams/graph?content=networks&year_start=1800&corpus=26&smoothing=3&year_end=2019&direct_url=t1%3B%2Cnetworks%3B%2Cc0#t1%3B%2Cnetworks%3B%2Cc0

central to the definition of platform capitalism – the new hegemonic business model of cognitive capitalism. Consistently with this trend, some management scholars propose to rebuild corporate governance based on the motto “*connect and collaborate*” rather than “*command and control*” (Zara 2008).

The new managerial discourse encourages individuals to constantly initiate or join “projects”. Life is presented as a series of projects, whose social value is positively correlated with their variety. The temporary character of projects makes them suited to a network society: the succession of projects generates new links and favour the expansion of networks. The expansion of networks represents the dynamism of life while their stoppage is associated with death⁷². Those who have no projects and do not explore networks face the threat of social exclusion. Individuals are told to enlist in projects with passion and enthusiasm, to be flexible but not docile, to be at ease in every social environment while keeping a particularity to share, to be open to new ideas and able to see their potential. As they accumulate projects as varied and original as possible, individuals develop their employability, their human capital, increasing their chances to integrate other projects. The notion of “project” is so inclusive that it disregards the opposition between work and leisure, paid and unpaid, stable and precarious, quantifiable and unquantifiable. It renders the frontier between professional and private life more porous, favouring the existential investment of work as well as the economic instrumentalization of leisure. Neo-managerial discourses overtly criticize this separation of spheres which they find mutilating and propose to reintroduce personal relations at work. Likewise, the all-encompassing character of the notion of “project” allows it to depict capitalist as well as anti-capitalist endeavours, the creation of a start-up as well as the preparation of a strike. By masking the differences between capitalism and its opposition, it facilitates passages from a pole to the other, and most often the capitalist recovery of antagonist forces, aspirations, or “projects”. Temporary projects follow one another and recompose teams, generating new connections along the way.

Is neo-management soluble in neoliberalism? Can neo-management be reduced to the implementation of neoliberalism within the firm, understood as the neoliberal form of management? Neo-management owes a lot to the neoliberal ideology and largely converges with it. Nevertheless, I think it is not fully reducible to it as some of its attributes are better explained by the functioning of cognitive capitalism – of an economy based on the commodification of knowledge, its complex and tumultuous relationship with the free and open source software movement, and with the rhetoric and organisational principles of internet communities in general –, which only emerged after the 1970’s, while the history of neoliberal thought started in the industrial context of the 1930’s.

The man of networks constantly jumping from a project to another, passionate and dynamic, bold and risk-prone, developing his employability through his paid and unpaid activities, is largely assimilable to the neoliberal self-entrepreneur developing his human capital in every context. The new organisation of firms is largely based on the furthering of competition, which

⁷² This idea is reminiscent of Hardt and Negri’s social ontology, as we shall see in chapter 3.

reduces or dissimulates hierarchical control and fosters a self-control in line with capital's objectives. Not only does the outsourcing of multiple tasks replaces bureaucratic coordination with market-based coordination, but the bureaucratic structure of firms is transformed according to the principle of competition to create "quasi-markets" (Dardot et Laval 2010b). Quantitative evaluations nudge the actions of employees and push them to self-control. They encourage them to behave as rational enterprises in competition with others and to conceive much of their actions in terms of investment, production, costs and benefits that may be calculated. They are meant to check the adhesion of workers to the behavioural norm expected from them, to estimate and reward their subjective implication or sanction its lack. Dardot and Laval are right to remind that neo-management has developed in (and thanks to) a context of generalized social fear in which the social protections attached to the welfare state are being dismantled, labour contracts are becoming precarious, unemployment is high and large portions of the population of developed countries are pauperizing (Dardot et Laval 2010a). The humanist discourses of neo-management about self-fulfilment, conviviality or wellbeing (haven't we seen the arrival of "Chief Happiness Officers" in the enterprise?) should not hide that, if more subjective implication is expected from workers, it is largely because precarity increased their dependency to their employer. Post-operaists have taken too seriously the pretention of neo-managers to promote the "autonomy" of workers. Capitalist control over labour has not regressed to formal subsumption, but progressed towards "subjective subsumption" (Dardot et Laval 2015). We are not moving from heteronomy to autonomy. Rather, we are moving towards "individualised heteronomy", "interiorised constraint" (Dardot et Laval 2010b), or (in a more deleuzo-foucauldian terminology) from "disciplinary heteronomy" towards "control heteronomy" (Lojkin 2020). Dardot and Laval even argue that "neo-management is not 'antibureaucratic'" but rather represents "a new phase of bureaucratic rationalisation that is more sophisticated, 'individualised', 'competitive'" (Dardot et Laval 2010a). Also, Lordon rightly insists that historical modes of motivation of wage workers (survival, compensatory consumption, existential self-fulfilment) do not replace one another but come on top of each other (Lordon 2018). And though dominant discourses render more visible the most recent ones, the older ones are the most fundamental: wage work remains in its essence a bargain for life. In this respect, the structural asymmetry of power conferred by the private property of means of production renders perfectly ludicrous the pretention of the boldest neo-managerial discourses to substitute horizontal networks to hierarchy within firms.

Still, neo-management is not fully reducible to neoliberalism. The values it promotes (e.g., conviviality, sincerity, trust, cooperation, intuition) do not perfectly fit with a discourse meant to produce homo economicus. Even after having created quasi-markets to govern employees as individual capitalists in competition, firms cannot fully disaggregate and do not wish to. Firms want to persist in being. To do so, they need a minimum of social cohesion to make people work together in the same direction. The visions of leaders and the "soul" of corporations which demand to be loved by their employees do not come from the same discursive universe as the competitive and calculating self-entrepreneurs. And these differences are not "strictly rhetoric" (Dardot et Laval 2010a, p. 402-456), they are not simply an ideological veil putting glitters on a harsh reality. They are much worse than that in so far as they are functional to this reality: *neo-managerial discourses do not simply mask power within the enterprise but actively*

participate to its construction. For instance, Boltanski and Chiapello show that the theme of “trust” has been rising in managerial discourse while direct hierarchical constraint was declining. It is because “trust” is actually another name for self-control: it points to a relationship in which someone will act as he is expected to, without being controlled for it by any other means than a moral contract and given words. The introduction of personal relationships, moral ties, or informal language in the office are not simply rhetoric disguises. They are functional to the control of workers: if your manager is your friend, why wouldn’t he call you on Sundays? Similarly, the notion of projects and the metaphor of networks are not simply meant to mask a bureaucratic structure that is unchanged or changed solely by neoliberalism, they inspire profound transformations of the organisation and strategy of firms (and of the whole technosystem) and originate from the universe of digital technology and cyberculture⁷³. Also, the resurgence of the themes of “cooperation” and “collaboration” in neo-managerial literature cannot be understood without reference to the new forms of immaterial labour and the activities of online communities.

Finally, what shall we think about the post-operaist analysis of cognitive capitalism: is the “contradiction” between immaterial labour and capitalist relations of production as fundamental and insurmountable as it claims? I would argue to the contrary. Neo-management has largely tamed immaterial labour by developing sophisticated means of control and fostering self-control. The systematic use of quantitative evaluations of workers activity in the enterprise should not be interpreted as a desperate attempt to measure the immeasurable (Spence 2011), it has succeeded fairly well in measuring their work and even better in controlling it. Furthermore, some post-operaist claims and arguments appear less relevant since the rise of platform companies.

First, the new centrality of data and algorithms in value-creation and business organisation suggests that post-operaists have overestimated the “new hegemony” of living labour (in the form of knowledge) over dead labour (in the form of information). As we have seen, post-operaists interpret the omnipresence of the notion of “immaterial capital” in mainstream economic discourse as a symptom of this new hegemony of living labour, since a large part of that capital consists in the living knowledge of immaterial workers. However, the notion of immaterial capital does not only cover that living knowledge. It also comprises the immaterial part of fixed capital (e.g., brands, patents and copyrights, data and algorithms) whose economic importance increased with the development of platform companies. That immaterial part of fixed capital is as dead as the material one and in many cases cannot be separated from it: the massive amount of data on which capitalist platforms depend require for their extraction, storage and processing physical infrastructures that are extremely expensive in terms of money, energy and natural resources. In addition, immaterial labour is increasingly managed through algorithms designed according to capitalist interests (e.g., Uber drivers), in much the same way

⁷³To take only this example, a founding text of the Network Working Group (NWG), which developed standards and protocols for the Arpanet in the early 1970’s, declared: “We hope to promote discussion and exchange, rather than authoritarian propositions”. A member of the NWG also declared in an interview twenty years later: “We created a community of researchers in network who deeply believed that collaboration between researchers is more efficient than competition” (quoted in Flichy 2013). The hope to (at least partially) replace hierarchy and market competition with network collaboration has been explicit and central in the history of the internet.

as material labour was, in the industrial age, managed using machinery designed according to capitalist interests. We may note two significant differences though. The first is that industrial machinery was only used to control workers within factories, whereas algorithms are meant to influence and structure the activities of individuals in every social sphere. The second is that digital technologies seem more malleable than industrial machinery. In that, they could be more easily reconfigured and appropriated to support democratic organisations and emancipatory goals than industrial machines whose capitalist and hierarchical biases seem more structural. That point is more in line with post-operaism. However, this relative malleability of digital technologies may disappear overtime: it might not derive from their nature but simply from the fact that their design code is not fixed yet.

The second reason to question post-operaism in the light of platform capitalism regards its understanding of the stakes of intellectual property. Post-operaists have argued that intellectual property exemplifies the contradiction between immaterial labour and capitalist relations of production: capitalism can only value and commodify knowledge by imposing barriers to its circulation which hinder the collective dynamic of immaterial production. As we shall see, platform capitalism partially responds to this problem as it constitutes a business model that promotes the circulation of information and knowledge. Still, this should not lead us to think that intellectual property rights are not important anymore and that the battle for the free circulation of information is over. Only to see that it is less central to the new business models of cognitive capitalism.

Finally, we can acknowledge that the ties between technosystem and lifeworld (or work and non-work) have multiplied and complexified in the digital age. The frontier between these two fundamental spheres of life still exists, but it has become more porous. However, Ulysse Lojkine is perfectly right to say that: “It is not production that tends to become reproduction; it is reproduction that tends to become a capitalist production like any other” (Lojkine 2020). In other terms, this increased porosity and interpenetration does not mean that capital parasitizes an autonomous and spontaneous social dynamic which it will not be able to contain for long, as post-operaism claims. On the contrary, it means that social life and reproduction are becoming extensively mediated and structured by the capitalist technosystem – thus increasingly dependent and heteronomous. Multiple services and activities (e.g., cooking, cleaning, driving, teaching, caring) that used to be realised gratuitously in the household or within society are now taken in charge by capitalist production.

From Free Software to Platform Capitalism

The first section of the chapter outlined the main characteristics of the digital age (neoliberalism, cognitive capitalism, neo-management), discussed their articulation, and interpreted them as capitalist responses to the critiques raised by social movements of the late 1960s/early 1970s. It built upon Boltanski and Chiapello's argument that capitalism constantly rejuvenates itself by absorbing ideas and models which are deployed outside or against its realm and that this ability to incorporate critiques partially explains its longevity. This second section will argue that the digitalization of the technosystem was marked by a conflictual dynamic of the same sort (Broca 2015, 2020). "Digitalization" can be broadly defined as "the way in which many domains of social life are restructured around digital communication and media infrastructures" (Brennen et Kreiss 2016). It thus points to a much larger phenomenon than the concept of "digitization" which simply refers to "the material process of converting analogue streams of information into digital bits" (ibid).

Our analysis will focus on the history of free and open source software, the values and practices they promote, and the role they played in the shift from the first dominant business model of cognitive capitalism (which was fundamentally based on intellectual property), to the second one, platform capitalism, which is more compatible with networks, user contribution and the circulation of information⁷⁴. Our contention is that the role of the free and open source software movements⁷⁵ in this shift has been decisive. Not only did it launch a powerful resistance against the first IP-based model, but it also provided a source of inspiration and major technical infrastructures that supported the rise of platform capitalism. Despite certain ideological blind spots and a capitalist recovery of some of its central features, the free software movement has fought an essential struggle for freedom in the digital age and still holds emancipatory potentialities that deserve to be pushed forward.

The section is divided into four sub-sections. The first one presents an overview of the history of the free and open source software movements. The second discusses the main values and practices associated to the free and open source software movements: namely, autonomy in the sphere of work, technological creativity, and the free circulation of information. The third discusses the rise of platform capitalism and its relation to the free and open source software movements. The fourth tries to delimit the frontiers of work in the digital age by discussing which types of platform-mediated user activity should be described as such and which should not.

⁷⁴ This section builds extensively upon the works of Sebastien Broca, especially his book "Utopie du Logiciel Libre" (2013) and the two articles of 2015 and 2020 mentioned above. The first sub-section ("A Brief History of Free Software and Open Source") owes a lot to the first part of Broca's book ("Présentation du Libre"); the second sub-section ("Practices and Values of Free and Open Source Software") is largely a discussion of the second part of the book ("Ethos du Libre"); and the third sub-section ("Platform Capitalism") is inspired by the argument he develops in the two articles.

⁷⁵ I put an "s" to the word "movement" to mark a difference between the free software movement and the open source software movement.

A Brief History of Free and Open Source Software

Free software is defined by the four freedoms it permits: to run, to study, to modify, and to distribute the software. These freedoms require specific technical and legal conditions. Technically, they imply an open access to the software's source code, that is the instructions defining the software and commanding its execution. Coding amounts to writing and re-writing code in a given programming language (e.g., C, Java, Lisp, Python). Accessing the source code is necessary for anyone who would like to modify a software, or simply, to understand its functioning. The four freedoms may also be safeguarded or prohibited by law. Free software is defined in opposition to proprietary software. The latter do not grant access to the source code (they are sold already "compiled"⁷⁶) and require users to accept an end user license agreement (EULA) which strictly frame what they are legally entitled to do.

Free software is defined by liberty rather than gratuitousness. As the founding father of free software, Richard Stallman puts it: "To understand the concept, you should think of 'free' as in 'free speech', not as in 'free beer'" (R. M. Stallman 2002). Indeed, some proprietary software are gratuitous (they are called "freeware"), while some free software may be sold for money if they are packed with services (in that case the user essentially pays for the service). The vast majority of free software are gratuitous, but this comes as a consequence of the four freedoms: since they can be freely copied and redistributed, their cost inevitably tends towards zero. This gratuitousness frontally contradicts the first dominant business model of cognitive capitalism which was exemplified by the proprietary software industry: producing and selling information-intensive goods (e.g., seeds, software, brands, molecules, songs) that are protected by intellectual property rights which enable to sell each copy at a price high above its reproduction cost. Software that are collaboratively produced and grant an open access to their source code were central to the post-WW2 progress of information technology and the creation of the internet (Flichy 2013). They were then marginalised in the early 1980's as the proprietary software sector emerged concomitantly with neoliberalism and its sacralization of property. The Free Software movement developed in reaction to this dynamic and led a fierce resistance which resulted decades later in an ambiguous success: free software are almost everywhere now, they are deeply embedded in most of today's digital technologies, but the values promoted by the free software movement seem to be more threatened than ever.

Software development did not represent an autonomous economic sector until the early 1980's (Broca 2013). In the 1970's, computers were big and expensive machines that could only be afforded by enterprises and public administrations. The IT industry was based on the commerce of hardware and largely dominated by IBM. IBM would equip its customers with hardware while providing the operating system, various software, peripheral devices and services. The customer company's computer engineers would write new software or improve the existing ones to adapt them to their specific needs and IBM often assisted them in that process. It was thus in the interest of IBM to provide its customers with gratuitous or very cheap

⁷⁶ Computer code may present itself in two forms. As a *source code* it may be read and written by a computer scientist. It then has to be compiled to become an *object code*, made up of a series of "0" and "1" that a machine can execute but a human cannot read. Converting a source code into an object code is relatively easy, but the opposite operation is incomparably more complex.

software and grant them the right to access and modify the source code. It facilitated the sale of expensive machines and enabled the corporation to integrate the improvements made by its customers to its own software, while preventing the emergence of an independent software sector.

This situation was radically changed by the combination of three events (Broca et Coriat 2015). The first one is a legal procedure launched by the US Department of Justice in 1969 against IBM for infringement of the antitrust regulations (*Sherman Act*). The firm was criticized for bundling hardware and software to make potential competitors unable to produce software compatible with its computers. The judicial process finally acquitted IBM but in the meantime encouraged the firm to unbundle hardware and software and to cease providing open source software gratuitously. It thus paved the way for the development of an independent software production sector. The second event is the vote of the *Software Copyright Act* in 1980 which clarified the legal status of software by recognizing the right to protect it under copyright law. The third one is the massive diffusion of personal computers in the US in the early 1980's. It became technically feasible to develop micro-computing during the 1970's thanks to the invention of microprocessors. Yet, IBM did not see their use at first as it associated IT with centralized information systems serving the top-down functioning of bureaucratic institutions. On the contrary, a couple of young amateurs, especially Californian students influenced to various extent by the 1960's radical culture, quickly saw the potential of micro-computing for the realisation of their social vision. Major figures among them (e.g., Steve Jobs, Steve Wozniak) regularly met at the Homebrew Computer Club to exchange their ideas and work together. The Apple II was engineered in a garage and quickly became a best-seller after its launch in 1977. IBM managed to join the trend by successfully launching the sale of its first PC in 1981 but lost its hegemonic position in the process. The mass diffusion of personal computers quickly turned software production into a very profitable and strategic sector. The arrival of computers in millions of households was also a powerful driver of the closure of the source code: the new average PC user had no technical skills, could not read or write code, and simply did not care.

Within a few years, the rise of proprietary software deeply transformed the computing world. The culture of computer engineers was until then characterized by academic norms⁷⁷ (e.g., knowledge sharing, collaboration, peer judgment) and a certain counter-cultural contempt for bureaucracy. It rapidly became pervaded with market imperatives as many hackers (skilled IT enthusiasts) started to join the corporate world and sign confidentiality agreements with their employer. Code sharing increasingly appeared as a mark of pointless nostalgia. Bill Gates was a pioneer on this path. In 1976, he published in the Homebrew Computer Club's newsletter, an open letter denouncing the fact that 90% of the users of the software he had just developed with Paul Allen (Altair Basic) did not pay for it (Gates 1976). He assimilated this typical practice of the hacker world to "theft" and accused it of preventing the development of "good software". His text mostly provoked hostile reactions among the Club at the time, but a few years later,

⁷⁷ Academic norms themselves have changed historically with the neoliberal transformation of universities: the generalization of precariousness, the encouragement of competition, the growing influence of the private sector and the promotion of intellectual property profoundly changed the values which prevailed in public institutions of research and education until then.

his opinion would reach majority. In 1980, his young company (Microsoft) signed a major contract with IBM for the development of the operating system (OS) of the firm's first PC. Following that contract, Microsoft's OS was automatically installed on every PC sold, inaugurating the company's hegemony over proprietary software. The evolution of software towards a closed regime of private property was not to the taste of everyone in the IT community. Many watched with reluctance this transformation that destroyed the values and practices characterizing their culture but felt powerless against a seemingly irresistible trend. Among them, Richard Stallman managed to launch a countermovement. This talented hacker became a well-known figure of the MIT's Artificial Intelligence laboratory in the 1970's, where he thrived among a community valuing open collaboration, anti-authoritarianism, and a certain hacker humour and creativity. In 1983, he posted a message in a Usenet (an ancestor of the Internet⁷⁸) conversation group that would launch the Free Software movement: he declared he would soon start writing a complete software system (an OS and complementary software), compatible with Unix and called GNU (GNU's Not Unix)⁷⁹, which he would freely distribute. The message also stated that any contribution in time, money, code, or equipment would be very welcome.

Building an OS from scrap that could compete with Unix was an extremely ambitious project. Unix had initially been developed by Ken Thompson at AT&T's Bell laboratories in the early 1970's. The software was the firm's property, but it had no right to commercialise it at the time, so it distributed it to universities freely or for negligible fees and with very permissive licences. The software became popular among university computer engineers, who spent years fixing bugs and developing new versions that turned it into a very robust system. However, in the early 1980's, the new legal and socioeconomic environment was much more favourable to proprietary software which encouraged AT&T to charge higher fees and impose more restrictive licences. The response proposed by the GNU project was not only technological but also aimed to recreate a hacker community around clear values and to promote free software as a social movement. Stallman published the GNU manifesto and founded the Free Software Foundation (FSF) in 1985, progressively clarifying the definition and principles of free software. The movement straightforwardly attacked the first dominant business model of cognitive capitalism, but Stallman had no anti-capitalist agenda. He developed a politically liberal discourse insisting on individual freedoms, especially free speech (code was assimilated to a form of speech), disregarding issues of economic inequalities, and promoting other values associated to hacker culture (collaboration, user rights, free circulation of information). As

⁷⁸ The main ancestor of today's Internet is the Arpanet, which was developed during the late 1960's and the 1970's by the collaboration of administrators of the ARPA (the Advanced Research Projects Agency affiliated to the US Department of Defence), computer engineers from various universities, and a young enterprise (Bolt Beranek and Newman) started by MIT scholars. Usenet (abbreviation of Usenix Network) was an autonomous initiative developed by computer science students and scholars in the late 1970's, to exchange files and messages between different computers running on the Unix OS via the telephone network. A bridge between Usenet and the Arpanet was developed in 1982, and the two networks were incorporated to the nascent Internet during the 1980's under the supervision of the National Science Foundation (Flichy 2013).

⁷⁹ Naming software with recursive acronyms was a tradition among the MIT's hacker community: it started with a software entitled TINT for "Tint is Not Teco" and was followed by many others, such as SINE for "Sine Is Not Emacs". The name GNU was also chosen by Stallman for the simple reason that he found the word amusing (Broca 2013, p. 70).

Sébastien Broca puts it: “Free software’s radicalness resided less in its explicit project than in its technical and juridical practices, frontally opposed to the dominant economic models” (Broca 2020).

Indeed, one of the most important innovation of Richard Stallman was juridical. He progressively realised that copyright law enabled authors to authorize certain uses of their works that are usually forbidden, as long as they associate specific licences to their copyright. In 1989, he wrote with the help of the law Professor Eben Moglen the General Public License (GPL), which he would then use on every program developed by the GNU project. Not only did the GPL grant the four freedoms of free software to every user, but it introduced a constraint. All derivative works had to be protected under GPL as well, and thus, to uphold the four freedoms. This juridical gesture notably differs from the public domain regime. During the 1980’s, universities used to put some of the software code they developed in the public domain to make it accessible to all, but this enabled enterprises to integrate such code within slightly improved proprietary software. The code developed by universities was not in itself, privatised, but its further developments generally became proprietary. The public domain was thus unable to keep software durably free. To the contrary, the GPL could safeguard the openness of digital commons through the use of the exclusive privileges conferred to authors by copyright law. The obligation to protect derivative works under a similar licence favoured the mass diffusion and success of the GPL. It was a major juridical hack that Richard Stallman decided to call “copyleft” (inspired by a proposition of the artist and programmer Don Hopkins). In the early 2000’s, a group of law scholars including Lawrence Lessig and James Boyle developed the creative commons licences to push forward the approach initiated by Stallman and favour its diffusion to other cultural domains (e.g., literature, music, cinema). These six different licences give authors a wider range of options regarding the rights they are willing to grant to the public: the right to modify, to commercialise, the obligation to distribute derivative works under the same conditions. By doing so, the creative commons licences were meant to bypass the *a priori* and *bundled* restrictions of copyright.

In the early 1990’s, the GNU project had produced a couple of software but lacked a central element to build a functioning OS: a kernel. A young Finnish student named Linus Torvalds started working on it informally and shared his code online (on Internet conversation groups and then on the nascent World Wide Web) under GPL in 1992. Unexpectedly, hundreds of talented developers around the world started to join this open project, sharing pieces of code which would compose two years later a first version of the Linux kernel, able to function with GNU system. A free operating system was born (GNU/Linux) which became one of the most powerful and emblematic free software of all time. However, it could appear as a somehow mixed success to Stallman: he had no contact with Linus Torvalds and other Linux developers before 1993 and the new generation did not pay much respect to his role of pioneer⁸⁰. More significantly, free software development did not seem to have the same meaning for the two figures and their respective followers. Stallman had launched the GNU project based on explicit principles and values. He considered Free Software as a social movement and technology as a

⁸⁰ For instance, they soon referred to the new OS as “Linux” rather than “GNU/Linux”, thereby eclipsing the work done since 1983.

simple means to advance freedom. On the contrary, Linus Torvalds started coding “just for fun” (as he entitled his autobiographical book), out of passion for information technology (Torvalds et Diamond 2001). While Stallman considered proprietary software to represent a moral scandal, Torvalds did not mind using some when he found it more convenient. The gap between these two different approaches grew and led to the birth of the Open Source movement in the late 1990’s. The open source movement did not invent a new category of software⁸¹, it invented a new rhetoric aiming to favour the adoption of free software by enterprises, to break with the activist discourse of Richard Stallman and stimulate the emergence of innovative business models. The technological success of free software projects slowly started to attract the attention of the corporate world in the 1990’s, but the latter remained suspicious regarding a movement which seemed associated to radical ideas: Bill Gates repeatedly condemned it as “communist” (Jardin 2005), Steve Ballmer (Microsoft’s ex-CEO) referred to Linux as “a cancer” (Greene 2001), while different left intellectuals also saw in it an incomplete form of communism (Bauwens 2005; Gorz 2003). The expression “free software” also troubled companies since it was spontaneously associated to gratuitousness. Stallman recognized that the “open source” label had the advantage of ending this unintended ambiguity but rejected it for abandoning the ideal of freedom altogether.

The abandonment of the call for freedom by the advocates of “open source” was purposeful. They loudly denounced the “ideological” discourse of Richard Stallman and claimed to defend the opening of source code based on purely “pragmatic” grounds. Linus Torvalds bluntly declared that he thinks “ideology sucks”, arguing that: “This world would be a much better place if people had less ideology, and a whole lot more ‘I do this because it's FUN and because others might find it useful, not because I got religion’” (Torvalds 2002). The “open source” movement promoted a “sane” competition against proprietary software, without morally condemning their opponent nor refusing any arrangements with him. The method of development underlying open source software is simply more productive than the one behind proprietary software, they argued. As such, open source software can only surpass its rival in the long-run and impose itself by demonstrating its technological superiority. For “open source” advocates, information-sharing is mostly a means to develop efficient software, whereas it represents a major ethical value in the eyes of Stallman who considers technological efficiency as secondary.

Eric Raymond, a central figure of the open source movement and co-founder of the Open Source Initiative in 1998 (equivalent of the Free Software Foundation), wrote a famous essay describing the method of development of open source software (Raymond 1999). It opposed the organisational model of the “cathedral” to the one of the “bazaar”: the first would characterize proprietary software development (and to some extent the GNU project⁸²), while the second would characterize the development process underlying Linux and other open source projects. The cathedral model amounts to a bureaucratic coordination: a closed organization

⁸¹ Apart from a few exceptions, software labelled “open source” are also “free” according to the definition of the FSF. The open source label is only a little less restrictive: while the FSF defends the *obligation* to transmit the four freedoms to derivative works, the Open Source Initiative only defends the *possibility* of transmitting them.

⁸² The accusation of lack of openness directed against the GNU project was very polemic and rather unfair in my opinion.

with determined members and external delimitations is hierarchically structured so that the vision defined at the top can be executed by all lower levels to achieve a consistent product. On the contrary, “the Linux community seemed to resemble a great babbling bazaar of different agendas and approaches [...] out of which a coherent and stable system could seemingly emerge only by a succession of miracles” (Raymond 1999). Raymond argues that the greatest invention of Linus Torvalds is not so much the Linux kernel itself, but the Linux development model. The bazaar model finds its superiority in its ability to mobilise developers’ intrinsic motivations, to encourage reputation building, develop self-regulatory mechanisms, and in a strategy consisting in frequently releasing imperfect versions which can be quickly improved by a large community. The core difference is that the greater number of developers mobilised in the bazaar model facilitates bug-fixing: “Given enough eyeballs, all bugs are shallow”. That is the Linus’ law according to Raymond. The open development process treats all users as potential co-developers and thus mobilise the knowledge of many.

Broca rightly argues that the pretention of the open source movement to be purely pragmatic and devoid of ideology is unconvincing: like the free software movement it proposes ideas, representations and normative judgements regarding free software and the way it should be developed (Broca 2013). Rather than a social movement driven by inflexible ethical values and aiming for the advancement of individual freedoms, it proposes a techno-economic approach whose lack of fixed principles should not be mistaken for neutrality. It simply distances itself from the social goals of free software. The dispute between “open source” and “free software” generated division but did not tear apart the community of open developers. Large open development projects usually unite developers of both trends, as well as many who do not take side and do not necessarily pay much attention to the debate. Despite the controversy, a single category of software remains, often referred to as Free and Open Source Software (FOSS). Still, the open source movement was a major step in the transition to platform capitalism (as we shall see) and was tremendously successful in reaching its goal: developing commercial activities based on free software, integrating free software to capitalism.

Until the mid-1990’s free software was fully dissociated from the market sphere: free software were gratuitous and only produced by passionate and unpaid hackers, who wrote code in their spare time for the sake of programming, learning, creating useful software, and getting recognized for their skills. Monetary flows were limited to the few donations received by the Free software foundation. The situation started to change with the first commercial distributions of Linux⁸³: SUSE and Red Hat. These companies sell Linux distributions with added value: they are tested, packaged, tailored to meet the needs of specific economic sectors. Their business model consists in selling a set of services related to a free software (e.g., installation, personalisation, maintenance, formation, consulting). They encourage the development of an “ecosystem” implying market activities and non-market activities: the production and diffusion of free software by unpaid hackers generate more opportunities to sell associated services. Michael Tiemann (one of Red Hat’s current top manager) wrote about his first impressions on the GNU manifesto: “On the surface, it read like a socialist polemic, but I saw something different. I saw a business plan in disguise” (Tiemann 1999). In the early 2000’s, large firms of

⁸³ A Linux distribution is an operating system which is developed based on the Linux kernel.

the IT sector also began to join the open source economy. IBM exemplifies this trend. In 1999, it chose to “open” much of the software code it had produced and to set up teams of engineers to work on open projects such as Linux and Apache. This strategy enabled the firm to develop new service activities and to massively reduce its R&D expenditures. The two pillars of the open source economy were then in place: selling services rather than proprietary informational goods and pooling R&D expenditures to reduce their costs.

Today, the Linux kernel is essentially developed and maintained by employees of transnational firms (e.g., IBM, Google, Samsung, Intel, Novell, Huawei), while unpaid hobbyists represent less than 10% of the contributions for each of its new releases (Kernel Patch Statistics d.). This does not mean that there remains no free software developed only or mainly by unpaid contributors; simply that many major open projects are now essentially propelled by large firms. Every important Silicon Valley corporation now makes an extensive use of free software. Linux is integrated to internet boxes, e-book readers, GPS, android-based smartphones, routers, servers etc. Amazon cloud services can only run with the help of a variety of free software (e.g., MySQL, Elastic search, Docker, Hadoop), while Google internally uses Debian (an important Linux distribution). Even Microsoft now displays its support for open source software: it has opened some of its patents and bought GitHub, the most famous code-sharing platform (Broca 2020). As free software came to be integrated to the internal functioning of capitalist firms and products, it got increasingly interconnected with proprietary software (which clearly has not disappeared), sometimes rendering more difficult the application of the copyleft⁸⁴. Nonetheless, the development of an open source economy involving major corporations was positively received by most developers: it represented a recognition of the quality of free software, a boost to their development, as well as an opportunity for some unpaid hackers to pursue their passion in better conditions by integrating companies.

⁸⁴ It is sometimes unclear whether a new software is “derived” or “dynamically linked” to a pre-existent software under GPL, and the transmission of the four freedoms to the new software is only mandatory in the former case.

Practices and Values of Free and Open Source Software

The practice of free software programming is central to the definition of the hacker identity; to the extent that the hacker ethic cannot really be distinguished from what Broca calls the “free ethic” (“*ethos du libre*”). The notion of “hacker” has changed overtime. The terms “hack” and “hacking” initially emerged in the MIT students’ jargon of the 1950s to refer to creative and harmless pranks often involving some tinkering (Stallman, Williams, et Masutti 2013, p. 279-287). Over the decade, as the institution became increasingly competitive and demanding, “hacking” became a way for students to mock this culture and relieve the pressure. Exploring the forbidden areas of the campus for instance, was called “speleo-hacking”. In the early 1960s, some students of the *Tech Model Railroad Club* started to describe themselves as hackers. They spent their time improving and remodelling a telephone-controlled train circuit for fun. With the arrival of the first computers on the campus, hackers started programming with the same playful spirit. Among their achievements, we may recall *Spacewar*, a videogame they developed in the early 1960s for their own entertainment and whose code they freely shared. The idea of open and collective innovation associated with code writing and sharing contributed to take away the notion of “hacking” from its 1950s meaning. The activities of the members of the MIT’s AI lab in the 1960s and 1970s reinforced the association of “hacking” with information technology and programming.

The term “hacker” also took on an elitist connotation at this time: a hacker not only was someone who programmed by passion, but one who would do it with a certain virtuosity. The free software movement surged right out of this culture in the 1980s, to protect it from the rise of proprietary software and expand it globally. In the same decade, the practice of breaking into others’ computer systems became more current as access to personal computers grew within society. Numerous media outlets started referring to this practice as “hacking” and often to reduce the term to this meaning⁸⁵. Most hackers tried to distance themselves from this practice by calling it “cracking” rather than “hacking”. Yet, they would consider that some “cracks” (acts of breaking into a computer system) could also be “hacks” if they were creative, recreational, and harmless. Media discourse further deteriorated the image of “hacking” by using the term to describe various malevolent actions achieved through IT (e.g., the creation and dissemination of viruses, identity theft), which were quite far from the original hacker culture.

Our use of the term “hacker” points towards this culture of skilled computer scientists who program with enthusiasm and “in a spirit of playful cleverness” (R. Stallman s. d.). Hackers involved in the programming of free and open source software attribute a variety of meanings to their practices. Nonetheless, it is possible to identify a set of fundamental values that they all tend to share and which is constitutive of a loose hacker ethic. According to Sebastien Broca (2013), the three core values of the hacker ethic (or “free ethic”) are autonomy in labour, technological creativity, and the free circulation of information. The cultural and political echo

⁸⁵ The success of this meaning can be illustrated by the fact that it is the only definition of “hacker” given by the Cambridge online dictionary: “Someone who gets into other people's computer systems without permission in order to find out information or to do something illegal” (Cambridge Dictionary s. d.).

of these hacker values has now spread well beyond the world of hackers, to infuse society at large. We will now discuss each of these three values successively.

The many successes of FOSS projects in their fierce competition against major IT firms (e.g., Microsoft) attracted a significant amount of attention in the IT community, academia, and the wider public. It came as a surprise which destabilized well-established beliefs:

“At the heart of the economic engine, of the world’s most advanced economies, we are beginning to notice a persistent and quite amazing phenomenon. A new model of production has taken root; one that should not be there, at least according to our most widely held beliefs about economic behaviour. It should not, the intuitions of the late-twentieth-century American would say, be the case that thousands of volunteers will come together to collaborate on a complex economic project. It certainly should not be that these volunteers will beat the largest and best-financed business enterprises in the world at their own game. And yet, this is precisely what is happening in the software world.” (Benkler 2006, p. 59).

This observation takes us back to a decisive question that we have discussed at the end of the first chapter, and whose answer supported the division between two conceptions of social emancipation. The question was: can workers re-appropriate and transform the industrial technosystem to establish self-management in the sphere of work? Or is the modern industrial technosystem intrinsically incompatible with self-management and necessarily requires either private or state capitalism? The answer to this alternative led to conceive emancipation either as the *exit from* labour and the technosystem (Gorz, Habermas) or as the radical *transformation of* labour and the technosystem (Castoriadis, Feenberg, Marcuse, Marx), as an external limitation or an internal transformation the technosystem.

For the many people (on both the left and right) who believed that self-management was incompatible with the extensive division of labour sustaining modern production, the success of free software projects was – to say the least – quite disconcerting in that they “do not rely on markets or on managerial hierarchies to organize production” (Benkler 2006, p. 60). This new model of production emerging in the digital age called for some explanations and theories which numerous authors soon came to propose (Bauwens 2005; Benkler 2006; Hippel 2005; Raymond 1999). Yochai Benkler’s notion of “*commons-based peer production*” (CBPP) has been the most influential and perhaps the most rigorous of these theorizations. He defines it as a “new modality of organizing production”⁸⁶ made possible by “the networked environment” which is “radically decentralized, collaborative, and non-proprietary; based on sharing resources and outputs among widely distributed, loosely connected individuals who cooperate with each other without relying on either market signals or managerial commands”. From Benkler’s perspective, free software was the most prominent but not the only instance of commons-based

⁸⁶ He refers to CBPP as a “mode of production” only twice in this 500-pages long book. Most often he seems to voluntarily avoid this expression whose Marxist accents would suggest that CBPP is meant to eventually replace the capitalist mode of production. On the contrary, Bauwens and Kostakis explicitly theorize CBPP as a proto-mode of production which may reach maturity and replace capitalism. Chapter 3 will extensively discuss these issues and get into the details of the theories of Benkler and Bauwens & Kostakis.

peer production. The other examples he gave not only included Wikipedia (whose affiliation to free software is rather clear⁸⁷), but also SETI@Home, a supercomputer and massive data storage system based on the pooling of the capacities of thousands of personal computers by their distributed users, or the NASA clickworkers experiment which showed that unpaid volunteers could replace professional scientists on routine tasks (e.g., marking craters on maps of Mars). He also remarked that peer production is not necessarily commons-based, but can also be achieved on proprietary platforms owned by profit-oriented firms who delegate some tasks to online crowds: Google's PageRank algorithm harnesses peer-based judgments (a link from a website to another counts as a vote of confidence from the former to the latter), Amazon fostered a user-generated system of product rating and recommendations (users rate and comment products, choose friends and favourites, their purchase are suggested to customers with similar tastes etc.), and massive multiplayer online games such as Second Life are largely peer-produced by players themselves. In addition, commons-based production is a larger category than commons-based peer production: a hierarchically organised non-profit institution can engage in non-proprietary and nonmarket information production.

The issue of power and risk of bureaucratisation is not completely absent from CBPP projects, especially as their scale grows. The governance mechanisms vary from a project to another, according to the practical problems that arise and the values of the communities, and some subtle elements of hierarchy may develop (Broca 2013). The development of the Linux kernel for instance, unites thousands of contributors and exemplifies open source values. Initially, Linus Torvalds moderated all contributions and decided which ones were to be integrated to the kernel. As the number of contributions grew, Linus decided to break up the kernel into many modules⁸⁸ accomplishing specific functions. Such modules could be developed independently before being combined and their moderation could be delegated. As a result, a pyramidal structure developed which counts various hierarchical layers starting with contributors, then maintainers, core developers, and at the top, Linus Torvalds, who is often described as a "benevolent dictator". Debian on the contrary, exemplifies free software values. This Linux distribution is essentially produced by volunteers, it has no commercial purpose, and its community is deeply attached to a series of principles which are stated in different texts: a "Social contract", a "Philosophy of Free Software according to Debian", and even a "Constitution". It unites more than a thousand members (Debian developers) and a few hundred regular contributors (Debian maintainers) in a very equalitarian productive community. However, this quasi-absence of hierarchy⁸⁹ is only made possible by a strict selection of members through formal procedures that evaluate their adhesion to the community's values, their implication, and their technical skills, before they can integrate the community. The organisation of Wikipedia also includes some elements of hierarchy in that some administrators

⁸⁷ It is called the "Free Encyclopedia", its contents are produced by volunteers collaborating online and released under the Creative Commons Attribution-ShareAlike licence.

⁸⁸ Benkler defines modularity as "a property of a project which describes the extent to which it can be broken down into small components, or modules, that can be independently produced before they are assembled into a whole" (2006, p. 100).

⁸⁹ Each year a chief of Debian is elected by members to represent the community, manage its resources, and appoints the members of the technical committee in charge of settling technical controversies.

(elected by the user community) have privileges enabling them to moderate the contributions and sometimes block malevolent users.

If these features should keep us from fantasizing CBPP projects as purely horizontal, we should still reckon that these hierarchical aspects are extremely loose and different from usual bureaucratic structures. Indeed, in CBPP, though some individuals are sometimes more prominent and have more influence or decision-power than others, they are not chiefs able to prescribe tasks to their subordinates and constrain them in their accomplishment. Their “power” is mostly limited to an *a posteriori* moderation of the contributions made by anyone. Work is voluntary and unprescribed, contributors can quit anytime they want, individually and even collectively by taking a copy of the code and starting a new community (a practice called “forking”). Also, any hierarchical differentiation is based on merit; it finds its legitimacy in the peer-recognition of the qualities demonstrated by an individual. We may therefore say that, despite these few loose elements of hierarchy, the extent to which commons-based peer production has realised the ideal of autonomy in the sphere of work is remarkable and has rightfully fascinated numerous people. A non-proprietary, non-market model of information production which has gathered thousands and sometimes millions (in the case of Wikipedia) of volunteers together, without a real managerial hierarchy to achieve complex products, is nothing short of a breakthrough. Bauwens and Kostakis consider that the mode of coordination enabling CBPP is based on stigmergy, that is “the phenomenon of indirect communication mediated by modifications of the environment” (Marsh et Onof 2008 quoted in Kostakis et Bauwens 2014, p. 54), in this case of cyberspace’s technological environment. Based on Andrew Feenberg’s notion of technosystem, we may note that, what this means, is that the relief of the bureaucratic and market-based coordination of specialized labours is rendered possible by an increased reliance on technology-based coordination.

The historical meaning and potential of hacker’s quest for autonomy in labour can be interpreted in – at least – two radically different directions (Broca 2013, p. 148): it can be seen as a way to surpass capitalism or simply as a way to rejuvenate it.

The first position may be exemplified by André Gorz⁹⁰ who viewed free software developers as “dissidents of digital capitalism” whose practices would pave the way for a “practical negation of capitalist social relations” (2003 p. 87-95). His position is very close to the post-operaist understanding of cognitive capitalism: immaterial labour may bypass capitalist control, the cooperation of cognitive workers connected in networks by means of computer points towards a post-capitalist future and hackers are at the forefront of the battle for its realisation. As we saw, Gorz (from the 1980’s to the early 2000’s) thought that the modern context of industrial production rendered necessary a sphere of heteronomous production in which work is coordinated by markets and bureaucracies, while the productive activities existing in the sphere of autonomy (e.g., cooking, tinkering) can only remain marginal. His opinion progressively changed in the 2000’s as he observed the achievements of free software (Gorz 2003) and later, the development of digital fabrication tools such as 3D-printers (Gorz 2007a).

⁹⁰ The different theories of the commons(s) as a mode of production (e.g., Bauwens and Kostakis, Kleiner, Rifkin, and to some extent Hardt and Negri) also uphold this interpretation. See Chapter 3, “Theories of the common(s) as a mode of production”.

At the immaterial level, the internet and personal computers would progressively enable to subtract the production of informational goods from the sphere of heteronomy, by peer-producing and sharing them at global scale following the examples of free software and Wikipedia. At the material level, digital fabrication tools would deeply transform the potential of local, self-managed production achieved by individuals, small groups or cooperatives:

“*High-tech means of production makes the industrial mega-machinery virtually obsolete*” (Gorz 2007a).

In a sense, this still looks more like an *exit from* rather than a re-appropriation and *transformation of* the technosystem, in that markets, bureaucracies, and industrial tools are abandoned (rather than transformed), while autonomy is developed outside of its realm. But what matters here is something else: autonomy is not confined to the fringe of the socioeconomic system anymore, the heteronomous structures of the industrial mega-machinery collapse while the heart of modern production finally realises the ideal of autonomy – since it found a solution to the problem of the extended division of labour (CBPP) and adequate tools (digital technologies). Work can finally become creative, expressive, self-fulfilling; it can be undertaken by passion, based on intrinsic rather than extrinsic motivations and thus realise the ideals of libertarian socialism. Hackers are seen as continuators of this tradition who found a practical way to adapt it to the digital age. This line of interpretation has had a strong echo in that it inspired political movements (e.g., alter-globalism) and theories (e.g., Kleiner, Bauwens & Kostakis, Rifkin), as well as economic (e.g., platform cooperatives), juridical (e.g., peer production license) or technological (e.g., open hardware) innovations. However, this visible anti-capitalist trend is clearly minoritarian among FOSS developers who, most often, adhere to the politically liberal values of free software or the “pragmatic” and business-oriented discourse of open source. More importantly, with historical hindsight, the least we can say is that Gorz has been over-optimistic and that his hopes did not materialise.

Pekka Himanen’s (2001) thesis exemplifies the second position. In his view, the hacker ethic would progressively infuse society and deeply transform capitalist management for the best. The hacker ethic promotes a vision of work as creative, fun, and undertaken by passion; as an activity which requires some efforts and attention but should remain intrinsically pleasant and rewarding. Himanen opposes this vision to the protestant ethic of work analysed by Max Weber (1905) and which was based on moral duty and monetary gain. Though we may not share his positive appreciation of the phenomenon, Himanen’s thesis has largely been confirmed: neo-management has deeply transformed the capitalist organisation of labour and shares many acquaintances with the values and practices of hackers. They both insist on intrinsic motivations (passion, creativity, game, expressivity), value social collaboration and flexibility, criticize hierarchical structures and the distinction between work and leisure. From the very beginning, the open source movement presented itself as a managerial trend denouncing centralisation and bureaucracy as inefficient. In addition, Linus Torvalds perfectly personifies the figure of the leader whose vision inspires others and encourages them to voluntarily collaborate to his project. Overall, the neo-managerial wish to dilute the vertically integrated firm in a network of teams, collaborating on temporary projects which consist in modules meant to be assembled *a posteriori*, largely looks like an attempt to mimic commons-based peer production.

Himanen's vision realised while Gorz did not: does this mean that one was right and the other wrong? Not exactly. Gorz never said that the free software movement and digital fabrication tools would *necessarily* lead to the extinction of capitalism; he only argued that it was a *possibility* and that it should be a strategic vision guiding anti-capitalist struggles – while these would ultimately determine the outcome. His formulations were no doubt over-optimistic and his argument has probably assigned to CBPP a role that is too great for it to reasonably endorse. Nevertheless, this does not mean that anti-capitalist movements should regard free software and CBPP as uninteresting or irrelevant to their objectives, they may still hold emancipatory potentialities.

Technological creativity is another central value of the hacker ethic. Hacking itself refers to a form of engagement with technology which is motivated by a “spirit of playful cleverness” as Stallman says. Hacking is equivalent to the second mode of democratic rationalization identified by Andrew Feenberg, which he calls the “creative appropriation of technology” (2017). That is, the transformation of a technology by its users so that it can meet new social demands that were not anticipated by the engineers who designed it. The whole purpose of the free software movement was to protect the freedom of users (to run, study, modify and distribute software) so as to promote an active and creative relation to technology.

One of Stallman's central claim is that users should be able to control their machines, rather than being controlled by them: “Nonfree software is controlled by its developers, which puts them in a position of power over the users; that is the basic injustice” (gnu.org s. d.). This argument is largely reminiscent of the critiques of industrial technology developed by thinkers of the New Left in the 1960's and on which we have insisted in the first chapter. It resonates particularly well with Ivan Illich's conceptual opposition between convivial tools – “those which give each person who uses them the greatest opportunity to enrich the environment with the fruits of his or her vision” – and industrial tools – which “deny this possibility to those who use them and allow their designers to determine the meaning and expectations of others” (Illich 1973, p. 21). André Gorz has been deeply influenced by Ivan Illich and explicitly pointed out the continuity between the latter's view of technology and the hacker ethic. In his last writings, he argued that free software and 3-D printers should be regarded as convivial tools (Gorz 2007b). Stallman also contested that proprietary software were neutral means that could serve any ends. Their closed and opaque design codes reflect the interests and worldviews of the companies which developed them. It thus imposes these interests and worldviews upon users – through technical prescriptions⁹¹ – and neglect theirs – forcing them to become passive consumers of fixed technologies that appear to them as black boxes.

To confront that reality, the free software movement promotes the notion of “hackability”. That is, the range of user initiative⁹² enabled by the design of a technology and permitted by law. A software whose code is open can be studied and modified by its user; it is thus highly hackable.

⁹¹ I use this term in the sense of Bruno Latour, which I have exposed in chapter 1.

⁹² The term “initiative” is used in the sense of Andrew Feenberg, as the fourth essential moment of the secondary instrumentalization that compose and re-socialise technological rationality. See Chapter 1, Andrew Feenberg's *Critical Constructivism, Impure Reason*

The promotion of hackability aims to surpass the rigid separation between user and engineer, which echoes the one between consumer and producer. The hackability of many products has deeply regressed in the last decades as Broca remarks (2013, p. 184): for instance, it has become quasi-impossible for a car driver with basic know-how in mechanics to undertake even minor reparations of his vehicle. In the field of information technology, Apple has become an emblem of this phenomenon in the eyes of hackers: the firm's products are recognized as qualitative and ergonomic but accused of being designed as black boxes that infantilize users. As Cory Doctorow from the Electronic Frontier Foundation puts it:

“The way you improve your iPad isn't to figure out how it works and making it better. The way you improve the iPad is to buy iApps. Buying an iPad for your kids isn't a means of jump-starting the realization that the world is yours to take apart and reassemble; it's a way of telling your offspring that even changing the batteries is something you have to leave to the professionals” (Doctorow 2010).

A major threat for the hackability of products lies in the spread of digital rights management (DRM). DRM is the practice of designing products so that they technically enforce intellectual property rights, thereby limiting users' range of possibilities. A smartphone with DRM may forbid the download of some applications whose diffusion are not in the interest of the manufacturer. A song, movie or e-book with DRM may prevent you from copying, sharing, modifying or simply from transferring it on another device. It may as well survey exhaustively the user's interaction with the media. The Free Software Foundation has therefore launched a campaign in 2006 against DRM, called “Defective by Design”⁹³. Hackers also criticize and distance themselves from those they sometimes call “geeks”, who are not concerned with understanding and controlling their technical objects, but simply fascinated by any trendy technical innovation and willing to buy the most up-to-date technologies. The term “geek”⁹⁴ would refer here to people whose fascination with digital technologies is associated to an attitude of passive consumerism and a mimetic attraction to fads, which sharply contrasts with the hacker ethic.

Sebastien Broca highlights a central tension between a form of technical elitism and the will to democratize IT-related knowledge, which has characterized hacker culture from its very beginning (2013, p. 219). Hackers want to share and spread their technical knowledge which they find fundamental for the preservation and furthering of freedom in the digital age. But by definition, a technical knowledge belongs to a community of specialists which values excellency, merit, performance, virtuosity. Hackers are torn between their desire to spread their knowledge through popular education and their defence of an expertise which clearly separates

⁹³ <https://defectivebydesign.org/>

⁹⁴ This use of the term is not the most current, it is used among free developers at least in the French-speaking world as Broca has shown (2013, p. 185).

Wikipedia gives a suitable definition of the term's most current meaning:

“The word geek is a slang term originally used to describe eccentric or non-mainstream people; in current use, the word typically connotes an expert or enthusiast obsessed with a hobby or intellectual pursuit, with a general pejorative meaning of a "peculiar person, especially one who is perceived to be overly intellectual, unfashionable, boring, or socially awkward” (Wikipedia 2020).

them from beginners. The different “third places”⁹⁵ (Oldenburg 1999) that gather hackers or makers⁹⁶ (e.g., hackerspaces, makerspaces, fab labs) can be intimidating for the uninitiated though they are – most often and in principle – open to anyone. The typical hacker or maker is white, male and very educated, often with an engineering background (Berrebi-Hoffmann, Bureau, et Lallement 2018). The elitism of hackers may be illustrated by a response they often give to beginners who ask a question whose answer they find obvious: “RTFM!” (standing for “Read the Fucking Manual!”). The mass diffusion of personal computers among the public in the 1980’s has favoured the closure of code as we have seen, since the lay cannot read or write code and rarely gets the stake of its openness. Similarly, the diffusion of 3-D printers among the public today tends to transform them into consumer objects, that are sold already-assembled and without open design plans⁹⁷: 3-D printing is taking the form of a technical hobby and those who practice it find it simpler to buy a closed source printer (Söderberg 2014). The history of hackers seems to reveal an unfortunate alternative: hacker technologies and practices either spread within the public and lose their subversive content, or they keep their principles of creativity, transparency and autonomy but remain the privilege of a fringe community. As he faced the closure of code in the 1980’s, Stallman pointed to a vicious circle: the public’s lack of technical skills favours the closure of code, which in returns cultivate their lack of technical skill and lock them in the position of passive consumers. This partially explains the inability of hackers to democratize their technical knowledge and its associated practices and values, but only partially.

I believe there is a more fundamental flaw in the hacker’s understanding of technology. To slightly caricature the typical hacker view, one may say that it consists in a conception of technical democracy⁹⁸ (debate (B)) that *hopes to solve the conflict between lays and experts by asking lays to become experts*. It is indeed laudable to spread a creative attitude towards technology and basic technical knowledge but technology is necessarily based on a specialised knowledge belonging to a limited expert community. No one can become an expert in every technical field; consequently, there will always remain lays and experts (unless civilisation collapses to the state of hunter-gatherers). For this reason, it is pointless to despair that most people do not want to learn extensively about the functioning of computers, 3-D printers or other digital technologies but simply to use some of these devices effortlessly. Technologies should be designed to be hackable, to promote user initiative and autonomy as much as feasible, but one cannot expect every user to hack them all the time. Hackers may focus too much on the creative appropriation of technology, while it is only one of the forms of democratic rationalizations. The design of any technology incorporates worldviews and interests, and though users can sometimes subvert and transform this design, we cannot expect everyone to constantly re-design every technical object he uses. The relative malleability of information

⁹⁵ Ray Oldenburg has developed the notion of third place whose use has now become widespread. While home represents the first and workplace the second place, other places of local sociality (e.g., cafes, libraries, churches, bookstores, parks) are referred to as third places.

⁹⁶ Makers prolong hacker values and practices but focus on material production. They develop open hardware (physical objects whose design plans are open source) and often use digital fabrication tools.

⁹⁷ The history of MakerBot Industries illustrates this trend.

⁹⁸ I speak here of ‘technical’ rather than ‘epistemic’ democracy since the specialised knowledge concerned is directly practical and technical. Still, the issue remains the one of debate (B), technocracy vs. epistemic democracy, in so far as it regards the relation between experts and lays.

technologies may have fostered this illusory ambition, but if we only think of a bridge, a factory or a nation-wide electric power system for a second, we easily understand that the individual end-user cannot reconfigure such technologies at will. What is needed most of the time, is that the variety of experts and workers engaged in the production of a technology (e.g., a bridge, a computer, a road) aim to translate in technical terms the values that matter to the concerned public (e.g., consumers, workers, people impacted by the production process), rather than the profit and domination objectives of shareholders and their managerial representatives. Simply put, technical democracy requires to produce for use rather than for profit. It is essentially in this respect that commons-based peer production represents an interesting phenomenon which may inspire emancipatory projects.

Furthermore, hackers are deeply technophile and as such, believe that emancipation will come through the internal transformation of technology rather than its external limitation (debate (C)). They are confident in the emancipatory power of the internet and personal computers and want the public to adopt these tools and develop the skills to master them. They may regard as bizarre or even suspicious people who want to limit their connection to the strict minimum or fully disconnect for a while. Their position can be described as a soft form of techno-determinism (debate (A)). They do not believe that technological development is autonomous; on the contrary, they forcefully insist that it is shaped by different social forces. However, they see in technological innovation and design a privileged vehicle for social change, they wish to transform society through technology⁹⁹. As Broca puts it:

“Between the idea that every technological choice is a social choice and the belief that every social choice is a technological choice, the line is thin. And free developers often cross it”. (Broca 2013, p. 223).

The free circulation of information is the third major value of the hacker ethic. The scientific ethos constitutes a first source of inspiration for this value. In a classical article, Robert Merton argued that the ethos of modern science is composed of four major norms: universalism, communism, disinterestedness, and organized scepticism (Merton 1973). The norm of communism sees the inputs and outputs of science as products of social collaboration that are meant to remain open to the universal scientific community. Scientists rely on the common fund of knowledge constituted by the product of all prior research, to further science by producing new research open to all. Similarly, Benkler recognized that commons-based peer production is not an entirely new phenomenon since “science is [also] built by many people contributing incrementally – not operating on market signals, not being handed their research marching orders by a boss – independently deciding what to research, bringing their collaboration together, and creating science” (Benkler 2006, p. 63). The scientific ethos also reduces the right of discoverers and inventors to the bare minimum according to Merton. They are supposed to hold only moral rights for their work, which grants them recognition and esteem. He even asserts that: “The communism of the scientific ethos is incompatible with the

⁹⁹ This idea has more to do with the second proposition of techno-determinism: society adapts to the imperatives of its technological base.

definition of technology as ‘private property’ in a capitalistic economy” (1973). It is important to bear in mind that hackers often have an academic background (as university students or professors) which has without doubt shaped their group ethic. The fact that “open science” has now become not only a successful expression but a movement of resistance, while it simply refers to what was previously viewed as a founding stone and defining character of science (communism), is illustrative of the degree to which neoliberal reforms have transformed scientific institutions in the digital age.

Another important intellectual source of hackers’ attachment to the free circulation of information may be identified in cybernetics (Broca 2013). Cybernetics is an intellectual movement which developed in the late 1940’s/early 1950’s and has attracted much public attention and enthusiasm for a few years, before being abandoned with the emergence of new disciplines – such as artificial intelligence – which took its status of technoscientific avant-garde. It is largely associated to its central figure, the mathematician Norbert Wiener (1894-1964), but has gathered many scientists from diverse disciplines: John von Neumann (mathematics), Warren McCulloch (neurology), Claude Shannon (engineering and mathematics), Roman Jakobson (linguistics), Talcott Parsons (sociology) or Margaret Mead (anthropology) for instance. Cybernetics was a resolutely transdisciplinary project which strived to unify mathematics and every discipline of social and natural sciences around a handful of concepts (information, communication, feedback). This unifying project was supported by a constant analogy between men, animals, and machines. According to Wiener, biological, social, and technological systems can be understood through the information exchanges that are achieved within and between them and cybernetics aims to describe them through these lenses. Information would represent negative entropy: Wiener understands entropy as a trend towards the disorganisation of a system associated to the increased uniformity between the elements it is made of, whereas information would resist to this trend by generating differentiation and organisation.

This communicative understanding of the world led Norbert Wiener to believe that the free circulation of information is the condition for social progress. Information exchange must become as open, free, and unambiguous as possible to foster social organisation. He promoted transparency against secrecy (associated to Nazi Germany or McCarthyism) and clear expression against jargon. Attributing private property rights over information to support its commodification thus appeared detrimental to Wiener: by hampering the circulation of information it would obstruct progress. Richard Stallman’s discourse¹⁰⁰ is in many ways reminiscent of Norbert Wiener’s, who spent his whole career teaching at the MIT and died a few years before Stallman started to visit the AI lab. Nevertheless, the legendary hacker claims he has never read the father of cybernetics and only recognizes that the latter might have been an indirect influence through the mediation of other members of the AI lab. Though diffuse and unconscious, it remains possible to believe that this influence has been substantial. The sheer attachment of hackers to the free circulation of information, however, may find its main origin in their practices rather than in their theoretical readings. As they write software and try to solve technical problems, they find themselves in the position of the scientist who needs to build upon

¹⁰⁰ He asserted for instance that: “The idea of owning information is harmful” (R. Stallman 1986)

a common fund of knowledge to make any meaningful contribution – who can only go farther “by standing on the shoulders of giants” as Isaac Newton once put it (*quoted in Merton 1973*).

The free circulation of information straightforwardly contradicts the foundation of the first business model of cognitive capitalism. The transnational firms embodying this business model (e.g., pharmaceutical, cultural, software, or agrochemical industries) successfully pushed to make intellectual property rights increasingly exclusivist across the globe since the 1980’s. The hacker culture and free software movement provided a powerful matrix of resistance against these transformations: an alternative model of information production, a set of values and practices, a global community including charismatic figures etc. It developed alliances with other movements contesting exclusive intellectual property rights in other domains: farmers unions, open science movements, promoters of generic drugs or open access to cultural works for instance. The widespread practices of peer-to-peer file sharing and illegal downloading of cultural works also contributed to the struggle against the IP-based business model. The hacker slogan “Information wants to be free” insists on the intrinsic characteristics of information which would require to treat it differently from material goods: it is non-rivalrous (its consumption by one person does not limit the capacity of others to consume it) or even generative (its consumption by one person facilitates the capacity of others to consume it) and it is hardly excludable (it is hard to limit its access). This explains why many hackers combine a (more or less) radical rejection of intellectual property rights with the acceptance of property-based markets in the realm of physical goods. Richard Stallman counts among them. He even criticized the notion of “intellectual property” itself (R. Stallman s. d.). The analogy with physical property is recent he argues¹⁰¹ and meant to legitimate a trend towards the reinforced exclusivism of multiple rights associated to three different sets of laws which developed separately (copyright, patent, and trademark laws).

Now that we have briefly presented the history of the free and open source software movements, as well as their associated practices and values, we will focus in the next subsection on the emergence of platform capitalism. The following analysis of platform capitalism aims to highlight that this business model is consistent with the essential characteristics of the digital age (neoliberalism, cognitive capitalism, neo-management) and that it responds to the values and practices promoted by FOSS against the IP-based business model of cognitive capitalism.

¹⁰¹ This point is disputed among legal scholars. Adam Mossoff for instance contends that: “Since the enactment of the Statute of Anne in 1709, the first modern copyright law, the justification for copyright has comprised two general normative theories. The first is utilitarianism, and the second is natural rights theory, particularly the labor theory of property and the social contract doctrine at the core of John Locke’s political philosophy” (2005).

Platform capitalism

After the explosion of the dotcom bubble in 2001 and even more since the financial crisis of 2008, new forms of digital-based economic models have emerged, which substantially differ from the initial IP-based model of cognitive capitalism. A profusion of concepts were proposed to describe these evolutions: web 2.0 (O'reilly 2005), crowdsourcing (Howes 2006), prosumer capitalism (Ritzer et Jurgenson 2010), sharing economy, gig economy, the fourth industrial revolution (Schwab 2017), digital labour (Scholz 2012), platform capitalism (Srnicsek 2017) etc. I consider the notion of platform capitalism is the most useful to understand current economic transformations. Platform capitalism should be understood as the new hegemonic business model of cognitive capitalism.

Platforms are digital infrastructures that enable two or more groups to interact (Srnicsek 2017). They position themselves as intermediaries between different groups of users: customers, advertisers, service providers, producers, suppliers, software developers, content creators etc. Most often, these platforms provide different tools enabling users to build and sell on it their own products and services: Microsoft's Windows or Apple's iOS enable software developers to create and sell apps in their ecosystem for instance. As they position themselves between users and as the ground upon which one can build his own activity, platforms are perfectly located to extract, record and accumulate data. A central characteristic of platforms (equivalent to the logic of economies of scale for industrial capitalism) is its reliance on network effects: "the more numerous the users who use a platform, the more valuable that platform becomes to everyone else" (Srnicsek 2017). One tends to join the most popular social network where his friends and family already are (e.g., Facebook, Instagram), use the carpooling (e.g., Blablacar) or taxi platform (e.g., Uber) with the most rides, or the search engine with the most efficient algorithm (Google), that is, the one that has been the most able to self-improve thanks to the data it has extracted from its multiple users. Since more users bring about more users, the platform model is characterized by a powerful drive towards concentration and even monopolisation. Network effects also encourage platforms to deploy cross-subsidisation strategies to attract users: a branch of the firm reduces the price of a good or service (or even provide it for free), while another branch raises its prices to offset these losses. Platform companies thus constantly try to find an optimal balance between what is paid or not, subsidised or not, what user groups should be charged and how much: Amazon prime delivery for instance, is a service that loses money on every order, but it enables Amazon to attract customers and make revenues elsewhere.

The most powerful and pervasive platforms are privately owned by profit-oriented companies (e.g., GAFAM). Yet, some platforms are cooperatively owned by different groups of users (e.g., Loconomics, Coopcycle) or owned by a non-profit foundation that simply maintains the infrastructure of cooperation afloat (e.g., Wikimedia Foundation). In the former case, though capitalist platforms tend to present themselves as neutral spaces favouring user interaction, they in fact embody a politics which is unilaterally set by the platform owner. The functioning of the algorithm is opaque to users and it can be changed anytime by the platform owner to their detriment. For instance, three days before I wrote this paragraph (on the 20th of December 2020), Deliveroo granted a bonus on each delivery to counter a strike made by its dispatch

riders in Strasbourg and Saint-Etienne (CLAP (@_CLAP75) / Twitter s. d.). Similar platform companies (e.g., Deliveroo, Uber) like to present themselves as empty vessels for market forces though they profoundly shape the form of the “market” which is under their private control.

Platform capitalism re-articulates and pushes further the diverse characteristics of neoliberalism, cognitive capitalism, and neo-management.

Neoliberalism is currently progressing through platformisation in many different respects: “autonomy” in labour is taking the form of flexibility (precariousness) on platforms, the rhetoric of the self-entrepreneur is guiding these transformations of labour, market rationality and economic calculation is expanding to new spheres of life, while competition is increasing at multiple levels and driving down wages. The platform companies that most strikingly embody these dynamics are the ones that we may call on-demand work or gig work platforms. These platforms mediate the exchanges between on-demand service workers and on-demand service buyers and may be subdivided into two categories depending on whether they concern in-person or remote services (Kenney et Zysman 2019). Platforms that mediate the exchange of on-demand in-person services correspond to what Nick Srnicek calls “lean platforms” and what is often abusively called the “sharing economy” in public discourse: examples include Uber, Airbnb, Deliveroo, Blablacar, Lyft, or TaskRabbit. On such platforms, workers are legally independent freelancers (self-entrepreneurs) whose pay depend on the number and price of the on-demand (thus punctual) missions of in-person services they achieve. The “sharing” label comes from the fact that these in-person services often involve the monetization of an underused physical asset (e.g., an apartment, room, car, car seat), whose owner has to grant access to (or “share” with) its customers to make a revenue. The use of the term “sharing” does not seem justified however when it comes to a market exchange between strangers put in relation through a capitalist platform. And even less if we consider the degree of exploitation that the platform exerts on the service provider or the tax evasion which it massively practices (Bowers 2016). Rather than understanding the “sharing economy” as a serious analytical concept, it seems safer to approach it as a marketing strategy intended to promote such platforms and lobby against their possible regulations (Olma 2014).

Instead of seeing in the gig economy the introduction of disinterested social values in the economy, I agree with critiques who see in it an extension of market rationality and economic calculation to new social spheres:

“Before Airbnb, a vacant room at home was a ‘friend’s room’ or a free space available to new uses. It is now a loss of income. Before Blablacar, a lonely car ride was an occasion to daydream or to pick up a hitchhiker. Now, it is a money-making opportunity gone down the drain, thus economically speaking an outrage. We must unceasingly and in every respect keep counting, while the fear of ‘missed opportunities’ becomes our existential compass.” (Comité Invisible 2017)

Platforms of the gig economy promise an increase in autonomy, they promote the vision of a world where everyone would have multiple jobs in a lifetime or even simultaneously (as opposed to the stable full-time job which supported social integration in the industrial society),

and where everyone can become a self-entrepreneur, an independent capitalist. There is no shortage of improvised techno-gurus to promote this neoliberal or right-leaning cyberlibertarian myth. Laurent Wartel (a PhD researcher in economy) for instance has confidently asserted in *Le Monde* that: “Uber has realised the socialist dream: giving back the means of production to the worker!” (Wartel 2017). Similarly, Raphaël Liogier argues that we are living a profound movement of disintermediation which will end capitalism and make the market purer: individuals will not have to sell their labour force to capital anymore as they will be able to directly exchange with one another¹⁰² (Liogier 2016).

It is rather clear however that platform-mediated interactions and exchanges between individuals has not only disrupted traditional intermediaries (e.g., hotels, taxi companies) but introduced a new one: the capitalist platform. Uber drivers do not own and control their means of production since these essentially consist in the platform itself – which is composed of three sorts of assets that can be intellectually protected: the algorithms supporting the application, the data, and the brand (Carballa Smichowski et Coriat 2017). Their formal independence enables Uber to ignore the social protections associated to the legal status of wage work (e.g., social security and social contributions, minimum wage, collective representation, regulated dismissal) and leave its drivers pay for their car. I do not intend to suggest that all workers of the gig economy should be considered as employees of the platform they use. This depends on the degree of dependence of the worker to the platform and the extent of the control the latter exerts on him. Thus, it would make more sense in the case of Uber than of Airbnb for instance. The point is that these capitalist platforms exploit gig workers, who would be better-off if they could collectively appropriate and control their platform.

Gig workers are not independently operating on “the” market (which traditionally is a public good), they are operating on a private market controlled by a firm which extracts profit from their labour. Even on classical markets that are not privately owned, formally independent economic entities often maintain asymmetrical, subordinate and exploitative relationship between each other¹⁰³: in many sectors, subcontractors cannot but accept the conditions, orders and prices fixed by a large firm which is their main client (Lordon 2010, p. 47). Therefore, even if freelancers evolving on classical markets came to replace wage workers in significant proportions, they would surely remain in a position of subordination and dependence to powerful firms who own strategic material and immaterial assets – unless these assets were socialised. Thus, the mistake of Liogier and Wartel is twofold. They do not see that gig workers do not own their means of production and operate on pseudo-markets that are privately owned and controlled by firms that exploit them. And they neglect the fact that, even if they did own their means of production and operate on classical markets, they would probably remain subordinated to bigger market actors with incomparably more bargaining power than them.

Various platforms of on-demand remote services have also developed, such as Amazon Mechanical Turk, UpWork, 99Design, or InnoCentive. These platforms encourage paid forms

¹⁰² If Liogier’s discourse is largely reminiscent of Silicon Valley’s cyberlibertarianism, it also promotes ambitious forms of wealth redistribution which makes it less straightforwardly right-leaning.

¹⁰³ We saw that mercantile capitalism initially took this form with the putting-out system and have argued that today’s outsourcing scheme often imply much more control of capital over labour.

of crowdsourcing: companies outsource certain tasks to online crowds composed of individual freelancers paid on-demand via these platforms. The Amazon Mechanical Turk allows freelancers to achieve unskilled, standardised microtasks proposed by companies in exchange for micro-payments of a few cents or dollars. These microtasks cannot yet be done by artificial intelligences and actually serve to teach AI to do them. This explains the platform's name: the Mechanical Turk was a fake chess-playing automaton of the 18th century which was controlled by a human (Casilli 2015a). Upwork or Freelancer.com concern more complicated tasks that are still performed by individuals, while 99Design and Design.net focus on design (e.g., logo, T-shirt). InnoCentive enables firms to offer cash rewards to solve some of their most complex engineering problems. Instead of paying a full-time designer who will tediously produce a logo or an engineer who will eventually fail to solve some technical issues, these platforms allow firms to have entire crowds of freelancers working for them and to give only a punctual reward to the ones that succeed. Thereby, it puts downward pressure on wages by increasing competition between workers of developed and developing countries (these freelancer labour markets are global) and between wage worker and freelancers of various type (e.g., hobbyists, retired, part-timers).

Platform capitalism sharpens the competition between workers and simultaneously limits inter-platform competition as network effects tend to favour concentration and monopolisation. This monopolistic slope of platform capitalism and the various anticompetitive practices of platform companies¹⁰⁴ (Bourreau et Perrot 2020) are arguably in contradiction with the neoliberal ideology. This is much less straightforward than it may seem though: neoliberalism is a multifaceted and diversified ideological current and its vision of corporate monopolies has become ambiguous overtime (Birch 2016). According to Kean Birch, neoliberals were unanimously against corporate monopolies and supported antitrust regulations before the 1950's, but major thinkers of the Chicago school evolving in the field of financial economics then managed to reconcile markets and corporate monopolies. Their main argument built upon Coase's theory of transaction costs (Coase 1937) to present firms and markets as part of a same continuum. They interpreted firms as a nexus of contracts between different parties (e.g., managers, investors, workers, suppliers), as a quasi-market in other terms: "In this sense the 'behaviour' of the firm is like the behaviour of the market; i.e., the outcome of a complex equilibrium process" (Jensen et Meckling 1976). The sole focus of financial economics is the maximization of shareholder value and the alignment of managers on this objective. Since corporate monopolies do not affect this aim, they are not seen as a problem.

The platform model also comforts the major trends of cognitive capitalism identified earlier. The accumulation of labour productivity gains throughout the history of capitalism has progressively reduced marginal costs and decreased the profitability of the manufacturing sector, thus encouraging the emergence of the first IP-based model of cognitive capitalism. Consequently, cognitive and affective labour came to prevail over material labour in processes of capitalist valorisation. The creation of value by and on platforms illustrate this evolution: a company essentially needs highly qualified cognitive labour to create and maintain a platform,

¹⁰⁴ These practices include mergers and acquisition of emerging competitors, personalised prices (each customer may get a different price based on its data-informed profile), the fact that platform companies which also sell goods & services on their platform can favour them, product tying etc.

while platform users manipulate symbols and affects as they communicate and exchange services. The increasing importance of access (relatively to ownership) (Rifkin 2001) also results from the relegation of material labour to a secondary role in value chains. The development of “product platforms” (Srniczek 2017) that sell goods as a service is a major illustration of this new pre-eminence of access¹⁰⁵. Instead of selling a good (e.g., cars, houses, razors, songs, movies) to customers once and for all at a competitive price, these platforms grant a temporary access to them by rental or subscription. Subscription models have existed for centuries already (e.g., for newspapers) but they are currently expanding significantly at the expense of the sales of goods in many sectors. An early example of this trend comes from the jet engine business. The three main manufacturers (Rolls Royce, GE, Pratt & Whitney) used to manufacture and sell their jet engines to airlines, which implied intense competition and low margins. Since the late 1990’s, they progressively moved to the “goods as a service” model in which the airline pays a fee for each hour it uses an engine and gets maintenance services provided for free by the manufacturer, who progressively improve its products thanks to the data it extracts from their use. The business model of jet engine manufacturers has in this way turned much closer to the one of a service company. Environmentally-wise, the goods as a service model seems to have advantages: since profits depend on the durability of the product, planned obsolescence is not in the interest of the manufacturer anymore. Nonetheless, this trend is largely driven by capital’s will to find innovative ways of charging consumers in a context of low marginal costs, and by the stagnation of wages and decline in savings which pushes people to opt for seemingly cheaper subscription fees rather than big purchases like a car.

Netflix and Spotify are two major examples of product platforms concerned with cultural goods. Overall, the IP-based model has receded and been surpassed by the platform model, but these product platforms show that it has sometimes evolved and merged with it. The near zero marginal cost of informational goods made it extremely easy to illegally download films and music from the internet in the late 1990’s, which seriously threatened the IP-based model of cultural industries. Progressively though, the enforcement of cultural industries’ IP rights became more efficient on the internet, rendering the download and sharing of protected content more and more difficult. And simultaneously, product platforms such as Spotify or Netflix developed increasingly attractive subscription offers. Thus, after years of decline, the music industry is now seeing its revenues grow with the rise of such platforms that charge fees from listeners, record labels, and advertisers.

The emergence of “industrial platforms” (Srniczek 2017) also radicalizes some features of cognitive capitalism. It re-shapes manufacturing through digital technology and immensely amplifies the communication between factories and markets which Toyotism initiated¹⁰⁶. The industrial internet essentially consists in integrating sensors and computer chips in production and logistics process, connecting them via internet so that each element can communicate with all others in real-time without human supervision from workers, engineers, or managers. This projected evolution (promoted under the label “Industry 4.0” in Germany) is supposed to

¹⁰⁵ In-person on-demand service platforms such as Airbnb, Drivy, or Blablacar, as well as electronic marketplaces such as eBay or Amazon also exemplify the new primacy of access.

¹⁰⁶ Gig service work platforms also illustrate this dimension: they follow an on-demand or just-in-time logic, in which the decision to produce follows the expression of consumer demand.

optimise production by reducing errors, labour costs, energy costs, maintenance costs and increasing quality. It aims to improve the feedback loops from consumption to production by developing new products and features based on usage data extracted from existing products. It should also enable mass customisation, making it possible to individually customize each unit that comes down the assembly line. Industrial platforms are meant to become the digital infrastructures linking together sensors and actuators, factories and suppliers, producers and consumers, software and hardware. Platform owners should be the big winners of the industrial internet and exert a strategic control over global manufacturing in the future. Two large consortiums are currently competing to develop an industrial platform: a German consortium built around Siemens is developing the platform “Mindsphere” while an American one revolving around General Electrics is creating the platform “Predix”. That competition seems to follow a “winner-takes-all” logic that will lead to the emergence of a monopolistic platform.

Platformisation is also in line with prior neo-managerial discourses and practices. As we saw, with the rise of neo-management in the 1990’s, “the act of mediating, the art of weaving and using the most diverse and remote links, [got] autonomized, detached from other activities that used to cover it, identified and valued in itself” (Boltanski & Chiapello 1999, p. 176). Although the two sociologists mainly referred here to the increasing role of social capital in professional success (a trend that is also comforted by the platform turn), it is hard not to see in it a premonitory glimpse on platforms – which are nothing but digital infrastructures mediating the interactions between various user-groups. The platform can be understood as the organisational model that capital has finally found to adapt to the network society (or digital age), to tame networks and subtly control them. Progressively, networks have turned into platforms and platforms have mostly become the private property of capitalist firms. In this respect, the expression “netarchical capitalism” (Bauwens 2005) is an interesting synonym of platform capitalism as it points to another dimension of the same phenomenon: the neologism “netarchy” refers to the hierarchy of the network. In the terms of Michel Bauwens and Vasilis Kostakis, netarchical capitalism “matches centralized control of a distributed infrastructure with an orientation toward the accumulation of capital”, it “enables cooperation but through proprietary platforms that are under central control” (Kostakis et Bauwens 2014).

We have also noted earlier that neo-managerial discourses promoted an evolution towards “lean enterprises”: “the typical image of a modern company today is a slim core surrounded with a nebula of furnishers, subcontractors, service providers, temporary workers whose amount vary according to economic activity, and partner enterprises” (Boltanski et Chiapello 1999, p. 125). The platform model materializes this vision; it is a slim core surrounded with a nebula of user groups. Furthermore, platforms have encouraged firms to further outsource a wide range of activities, blurring their boundaries and giving them the appearance of an ecosystem (Lemoine 2014). That is because digitalization has decreased transaction costs (the cost of bringing a good or service to the market)¹⁰⁷, which according to Coase (1937) determined the range of activities that firms would internally perform or outsource. Thanks to digital platforms, productive tasks are not only outsourced to professional subcontractors anymore, but to a wide range of

¹⁰⁷ The reduction of transaction costs is visible in many ways: it has become easier for individuals to sell a book on Ebay, to rent their house on Airbnb, or to temporarily work for Uber.

precarious freelancers (e.g., AMK, InnoCentive, Uber) and to service users or consumers (e.g., Facebook, Youtube, Google, Twitter, blogs, Second Life). Indeed, the whole point of the notion of “web 2.0” (O’reilly 2005) was to highlight that the web is increasingly user-generated: the content of Facebook or Youtube is produced by its users. Beyond the blurring of the frontiers of companies, this new dimension of outsourcing also questions the ones between professional and personal life, work and leisure, production and consumption. It also further encouraged companies to appeal to the intrinsic motivations of workers and platform users, to gamify work and make leisure productive.

Finally, Google and Facebook exemplify the oldest and one of the most important type of capitalist platforms, that is “advertising platforms” (Srnicsek 2017). This model emerged in the aftermath of the dotcom bubble’s burst. Google was then searching for new stable revenue streams and found a new use for the data it extracted from users’ online activities: beyond using this data to improve its search algorithm as it already did, the company would use it to sell targeted ad spaces to advertisers. This model was then followed by many companies (countless apps) but Google and Facebook clearly dominate the field: in 2017, Google captured 44% and Facebook 18% of the total revenues of online advertising (Boittiaux 2017).

The rise of platform capitalism as the second dominant business model of cognitive capitalism owes a lot to the struggles of the free software movement against the first IP-based model.

As we have seen, the open source movement has reconciled businesses with free software to the point that all leading firms of the Silicon Valley now use them extensively and many invest in their development so as to mutualise and reduce their R&D spending. For this reason, free software has been compared to the “roads and bridges” (Eghbal 2016) of the digital economy: they represent a cheap and shared digital infrastructure upon which companies can develop differentiated commercial offers. The GAFAM also found ways to benefit from Wikipedia: Google’s search engine systematically presents a boxed text of Wikipedia’s entry for the keyword searched by users, while Amazon’s virtual assistant (Alexa) uses Wikidata to answer questions (Broca 2020).

In addition, platform capitalism has been inspired in multiple ways by the practices and values promoted by the free and open source software movements. To the hacker’s quest for autonomy in labour (which largely echoes 1960’s counter-culture), platform capitalism responds by an extension of neoliberalism and new forms of neo-management. The founders of platform capitalism have also listened to the hacker’s call for the free circulation of information: openness, collaboration and information-sharing have become key to entrepreneurial success. They are functional to business models which need to attract as many users as possible to benefit from network effects. The promotion of technological creativity has also represented a crucial inspiration for the platform model: the idea is not anymore to sell finished technological goods to passive consumers, but to provide a technological environment in which users (or *prosumers*) will be able to share information, co-create and co-produce. Intellectual property remains important for platform companies: it is used to protect some strategic immaterial assets and

facilitate tax evasion by relocating such assets in tax havens. Yet, it is much less central than in the previous business model in at least two respects (Broca 2020). First, platform companies learned that it can be in their interest not to enforce exclusive rights on certain informational resources to extract revenues in new ways. Many have even joined the promoters of digital commons in their struggles against laws reinforcing intellectual property rights: Amazon, Facebook, Google, or Twitter for instance, were prominent opponents to SOPA (Stop Online Piracy Act) and PIPA (Protect Intellectual Property Act) in 2012. Secondly, algorithms and data can be difficult to protect with intellectual property and companies often prefer to keep exclusive control over these assets by other means (e.g., technical barriers): “traditional intellectual property rights play helpful but only secondary roles in the process of *de facto* propertization” (Cohen 2019, p. 45).

Platform capitalism curiously echoes the promotion of technological creativity and hackability by challenging the engineer/user and producer/consumer divides and encouraging new forms of user participation. But what form of user “participation” is encouraged on capitalist platforms? In what sense can their users be said to “participate”?

“If my participative gesture exerts no influence on the situation, like when we engage ourselves in pre-existing apparatus that are fundamentally defined by algorithms on which we have absolutely no control and which strongly constrain the range of our possible moves, it represents a superficial form of participation” (Proulx 2017).

The forms of user participation enabled by capitalist platforms are superficial in that users do not democratically govern the platform. They do not have the power to shape its technological design, nor do they have rights over the distribution of the revenues it generates. They enter a technological environment which is determined by rules they cannot define or even know (the functioning of algorithms is opaque to them), and which shape their participation and interaction. Such participation can still be described as “peer production” taking place within the constraining context of capitalist platforms, but it is radically different from commons-based peer production and the hacker ideals associated with it (Kostakis et Bauwens 2014). In opposition to the post-operaist interpretation, I contend that such user activities should not be seen as the illustration of an autonomous process of social production that capital would simply parasitize without contributing to it. It is true that they are not strictly commanded from above: Mark Zuckerberg does not order Facebook users to post cat videos or any other content in the same way that he can command his employees. Yet, user participation is thoroughly elicited, driven and nudged by the capitalist design of platforms.

Frontiers of work

To what extent online user contribution blurs the frontiers between work and non-work? Can we still draw a line that distinguishes the two? Although platform-mediated user activities significantly question the boundaries of work, I think that the concept can still be kept and delimited. Where shall we place the limit then: which user activities count as work and which do not? Among the various platform-mediated user activities which have been described as “prosumption” or “digital labour” in the literature (Ritzer et Jurgenson 2010; Scholz 2012), I propose to identify six main types loosely based on the typology developed by Kenney and Zysman (2019). The following table lists those six types of platform-mediated user activity and associate them to a platform type, give examples of platforms, precise whether the activity is paid or not, and give indications on its compensation and conditions:

<i>Type of platform-mediated user activity</i>	<i>Platform type</i>	<i>Example of Platforms</i>	<i>Paid or Unpaid</i>	<i>Labour conditions and compensation</i>
<i>On-demand in-person service work</i>	On-demand in-person service work platform	Uber, Airbnb, Deliveroo, TaskRabbit	Paid	Precarious, low income
<i>On-demand remote service work</i>	On-demand remote service work platform	Amazon Mechanical Turk, InnoCentive	Paid	Precarious, low income
<i>Sale of physical goods</i>	Electronic marketplace for physical goods	Amazon, eBay, Craigslist, Etsy	Paid	Precarious, low income
<i>Consignment content creation</i>	Electronic marketplace for informational goods (often advertising platforms)	Youtube, Amazon Publisher Services, Apple App Store	Paid	Skewed, with few having large returns
<i>Skilled and unpaid content creation</i>	Various types of platform	Huffington Post, LinkedIn, Linux, Wikipedia	Unpaid	Access to services offered by the platform; social recognition; “employability”
<i>Data generation</i>	Every capitalist platform, but paradigmatically advertising platforms	Facebook, Google etc.	Unpaid	Access to the services offered by the platform

The six types of user activities are subdivided in groups of two activity types that share common traits: the first two types regard on-demand service work, the two following ones regard the monetization of physical or informational goods on electronic marketplaces, and the last two types are unpaid. The designation of the first four types of user activity as work/labour is uncontroversial. They are labour in the modern capitalist sense of jobs or employment: a category that includes wage or independent activities that are undertaken in the aim to make a revenue from them.

The first two types of platform-mediated user activities (on-demand in-person or remote service work) have already been presented above and the third type does not require much explanation: it simply consists in selling physical goods on an electronic marketplace such as Amazon, Ebay or Etsy. The fourth however, ought to be briefly presented. Consignment content creation takes place on digital platforms such as app stores, Youtube, Amazon Publisher Services, or Twitch gaming network. Such platforms represent electronic marketplaces for informational goods functioning on the consignment model (Kenney et Zysman 2019). That model has long existed in the art world: the artwork (or informational good) is consigned to the gallery (or platform) and the potential income is shared between the creator and the platform. The creator gets paid only if his creation is sold; in which case, the platform takes a share of the revenues generated. Since digital platforms can host a virtually unlimited number of creations (contrarily to art galleries) it is the creator that bears all the risk. These electronic marketplaces are highly skewed: a few creators are hugely successful while there is an extremely long tail of content getting very little engagement.

Whether the last two types of user activities should be understood as “labour” is more controversial since they are not paid, nor motivated by monetary gain.

Skilled and unpaid content creation is a category that includes a variety of user activities that raise different questions which may receive tailored answers. I consider that some forms of skilled and unpaid content creation should be regarded as labour and remunerated as such. Within the category, we should distinguish the user activities taking place on capitalist platforms – which directly exploit users’ labour (e.g., LinkedIn, HuffingtonPost) – and the ones taking place on commons-based platforms – which can be indirectly exploited by capitalist firms (e.g., Linux, Wikipedia). In 2009, LinkedIn asked its members whether they would be willing to translate the site’s content to other languages for no pay (Ritzer et Jurgenson 2010). Similarly, Google has asked illustrators to provide free artwork for its web browser (Chrome) and Facebook has also called volunteers to translate parts of its website. Likewise, a controversy arose in February 2011 following the sale of the Huffington Post (a news website) to AOL (American Online) for 315 million US\$ (calimaq 2011). Indeed, this event angered the many unpaid bloggers whose work was responsible for a large part of the Huffington Post’s success and thus demanded a share of the benefits. In all these cases, the resistance of collectively organized digital workers could potentially lead to the institutionalisation of fairer mechanisms of redistribution of the exchange value they produce. Such struggles could bring some parts of the platform economy closer to the traditional capitalist regime of wage labour. It would be a non-negligible progress in comparison to these new forms of savage exploitation of unpaid labour, but the ownership and control over the platform would remain in the hands of private

capital. The cases of Linux and Wikipedia are very different. From the beginning, these platforms were fed by the skilled and unpaid work of volunteers driven by intrinsic motivation. Among other motivations (learning, fun, peer recognition), unpaid contributors had the satisfaction to create a useful good that would further digital freedom and be available to all as a commons. The meaning of this unpaid labour has been altered as major capitalist firms started to benefit from it for free, thereby giving to commons-based peer production some appearances of hidden and indirect exploitation. We will see later¹⁰⁸ that some legal solutions are being invented and experimented to protect digital commons from capitalist exploitation and potentially allow contributors to make a living (e.g., peer production license). Reaching the latter objective would amount to integrate such skilled contributions to the sphere of work.

The last type of user activity consists in the data generated by any online activity. Users generate data as they interact on and with platforms, by searching keywords on Google, posting a photo on Facebook, commenting a Youtube video, or buying an item on Amazon. The extraction and mobilisation of data is crucial to platform capitalism: “they educate and give competitive advantage to algorithms; they enable the coordination and outsourcing of workers; they allow for the optimisation and flexibility of productive processes; they make possible the transformation of low-margin goods into high-margin services” etc. (Srnicek 2017). In the early 2000’s, while authors such as Yochai Benkler (2006) and Lawrence Lessig (2004) were glorifying the internet participatory culture, Tiziana Terranova (2000) already denounced the exploitation of the “free labour” that user-generated content represented. Since then, a wide academic literature has developed that approaches the leisure-oriented and unpaid activity of content and data creation by social media users as “digital labour” (Casilli 2015a; Fuchs 2010; Scholz 2012). Another part of the academic literature (Srnicek 2017; Zuboff 2015) refuses to consider user-generated data as the product of a digital labour. Instead, it approaches data as a new strategic raw material of the digital economy. Like petroleum¹⁰⁹ which has no economic value until it goes through various processes (drilling, pumping, refinement and delivery), data would have no value either until it is processed by algorithms enabling its recording, curation, analysis, and delivery. I follow this latter trend of the literature and consider data as raw materials.

Whether or not data generation by platform users creates economic value is rather unclear; both sides of the dispute have significant arguments to put forward¹¹⁰. My rejection of the concept of “digital labour” is mostly motivated by an argument developed by Broca (2017). The problem is that it abandons an essential dimension of the notion of labour inherited from Hegel,

¹⁰⁸ Chapter 3, The Common(s) as a mode of production, The Reformist Perspective of Bauwens & Kostakis

¹⁰⁹ A limit of this analogy, however, is that data are not a source of energy contrarily to petroleum. Without energy sources, data could not be extracted, stored or processed. Data is thus a strategic raw material for digital capitalism, but the latter would collapse immediately in the absence of a more fundamental raw material – energy in any form (e.g., nuclear, fossil, wind, solar).

¹¹⁰ On one hand, the promoters of the digital labour approach argue that the disproportion between the profits and market capitalization of advertising platforms and the number of their employees, can only be explained by assuming that they exploit the surplus value produced by their users’ labour (Vercellone 2020). On the other hand, critiques of the digital labour approach argue that if data generation by platform users created surplus-value, then advertising platforms would massively stimulate global economic growth. Since the global economy is stagnating, these companies are most likely parasitizing other value-producing industries, rather than exploiting a whole new landscape of labour (Srnicek 2017).

who characterized labour as the conscious activity of a subject transforming the world according to his will, exteriorising or realising himself through this transformation. Marx had also kept this definition to characterize the anthropological dimension of labour (concrete labour) as opposed to the other form it takes under capitalism (abstract labour); the former being the source of use value and the latter the one of exchange value¹¹¹. When one makes a search on Google, his activity is conscious and voluntary; but his intention is not to be tracked by Google for data, it simply is to get search results. The subject's will (searching web pages) and the fruits of his action (data generation) appear dislocated; the data are generated as a by-product of his action rather than its voluntary result. It is true that labour understood as the exteriorisation and self-realisation of a subject through his conscious transformation of the world, was largely mutilated by Taylorism and that it was mostly an ideal guiding struggles for autonomy. Still, the difference between the industrial worker and the internet surfer seems to hold: the factory worker sets his body in motion to achieve a specialized productive task that he consciously aims (even though it gets recombined by coordination media in ways that he did not foresee), while the internet surfer does not act and communicate with the aim of producing data. In the absence of this subjective criterion, the notion of labour underlying the digital labour approach becomes all-encompassing:

“If you are wearing a connected object, then you keep working as you run or sleep. Each minute of our existence contributes to a productive activity. Today, the worker is everyone. Digital labour is the infinite extension of labour” (Casilli 2015b).

As inclusive as it is, the digital labour approach risks ending up seeing “labour” in the data-generating activity of all sorts of non-humans: machines in use, animals going by, plants growing, storms, fires, soils etc. can emit data as long as sensors are around. Considering that some of the major theorists of digital labour (Fuchs 2010) initially intended to apply the Marxist labour theory of value to social media, such a conclusion would be a dead end since Marx “presuppose[s] labour in a form that stamps it as exclusively human” (Marx 1867a, p. 127).

In sum, though the frontier between work and non-work has become more porous in the digital age, that frontier still exists: work contains all productive and consciously undertaken activities that are already remunerated; some productive and consciously achieved activities should be recognized as labour and remunerated as such; while routine content and data creation by platform users should not be regarded as labour. That last point is fully compatible with a radical critique of the capitalist capture of user data and with claims to either limit data extraction (*external limitation*) or socialize data centres (*internal transformation*).

The two first sections of chapter 2 have given a clearer picture of the digital age by defining the core characteristics of the period and discussing the interactions between its two successively dominant business models and the FOSS movements. The last section will outline the genealogy of the political reference to the “commons” in critical discourses of the digital age.

¹¹¹ “We pre-suppose labour in a form that stamps it as exclusively human. A spider conducts operations that resemble those of a weaver, and a bee puts to shame many an architect in the construction of her cells. But what distinguishes the worst architect from the best of bees is this, that the architect raises his structure in imagination before he erects it in reality. At the end of every labour-process, we get a result that already existed in the imagination of the labourer at its commencement” (Marx 1867a, p. 127).

A Genealogy of the Commons Discourse

Enclosures and progress

A key step in the genealogy of the political discourse of the commons is to be found in the publication of “The Tragedy of the Commons” by Garrett Hardin (1915-2003) in the journal *Science* of 1968. The article’s argument and the political intentions of its author have largely been obscured by the standardized and dominant interpretation of it made by the ideologues of neoliberalism in the following decades. A disturbing and rather stimulating thought experiment that allowed multiple interpretations, was irreversibly turned into an allegedly “irrefutable justification for privatization” (Harvey 2011) in various domains but prominently land and natural resources. Garrett Hardin was a neo-Malthusian and pro-eugenics biologist. He has spent his whole life focusing (scientifically and politically) on the “population problem” and its environmental consequences (Locher 2013). Did he champion economic liberalism? In the 1950’s, he celebrated some interventionist policies dating from the New Deal, which forbade or disincentivized agricultural practices that led to soil erosion. He insisted that private enterprises were driven by short-term interests and that the sustainable management of natural resources required State interventionism. At the same time, his pro-eugenics conviction led him to loudly condemn the Welfare State. He argued it represented a reversed eugenics policy that degraded the biological capital of the American society by enabling “naturally inferior” individuals to survive and encouraging them to reproduce. Hardin’s famous article of 1968 is fundamentally an argument against *laissez-faire* and individual freedoms. It especially focuses on the freedom to breed: individuals should not be left free to decide how many children they want to have, since this individual choice would have tragic collective consequences by leading to overpopulation and environmental destruction. Therefore, Hardin aims to “exorcize the spirit of Adam Smith in the field of practical demography”: the Scottish philosopher’s notion of “invisible hand” would have contributed¹¹² to a dominant “tendency to assume that decisions reached individually will, in fact, be the best decisions for an entire society” (Hardin 1968).

The tragedy of the commons is meant as a rebuttal of this idea. It unfolds as follows: “Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons” (Hardin 1968). Herdsmen are portrayed as rational individuals seeking to maximize their gain. Since each herdsman individually receives the whole gain of the sale of any additional animal he puts on the commons, while the effects of overgrazing are shared by all of them collectively, it is rational for each herdsman to put as many animals as he can on the common pasture. The result is the ruin of all. The tragedy resides in the inevitability of the mechanism: reason compels herdsmen to rush towards their collective ruin. Hardin believes this logic has been approximately understood for a long-time already – since the invention of agriculture and of the private property of land probably. Indeed, Aristotle for instance, already argued that “what is common to the greatest number has the least care bestowed upon it. Everyone thinks chiefly of his own, hardly at all of the common interest” (Aristote 2015, Book II, Chapter 3). However, Hardin believes the tragedy of the commons is only understood in specific cases though its underlying logic is pervasive. Oceans are suffering

¹¹² Hardin recognizes that Adam Smith himself did not claim that individuals’ self-interested decisions always promote the public interest, but only in some cases.

from unrestrained fishing which progressively depletes their stocks. National Parks are open to all visitors which ultimately threatens the ecosystems they shelter. Pollution displays another form of tragedy of the commons: here the issue is not about taking something from the commons, it is about putting something in it (waste of some sort). The commons end up tragically because they regard rivalrous resources (their consumption by one person reduces the ability of others to consume them) submitted to a logic of scarcity. They especially become scarce with demographic growth which represents the chief tragedy of the commons: people disregard global issues of overpopulation when they choose to have children, which would lead to infinite population growth on a finite planet.

Hardin does not believe these problems can be solved through calls to the conscience of individuals that are meant “to produce feelings of guilt in noncooperators”: such calls are both perverse in that they encourage remorse and inefficient since noncooperators receive no sanction and still have an interest in free-riding¹¹³. He sees only two types of solutions to the tragedy of the commons: privatisation or State coercion. If a common pasture is enclosed and turned into private property, its owner will be interested in its long-term sustainability and manage it accordingly. A State can also control its use and forbid or disincentivize (through taxes/subsidies) over-exploitative practices to promote sustainability: just as the New Deal policies stopped farmers from damaging soils. Hardin does not have an absolute preference for any of the two options. Instead, he suggests that privatisation tends to be more effective when the issue is about taking something from the commons (the commons as a food basket), while State coercion is probably more efficient regarding pollution (the commons as a cesspool): “our particular concept of private property, which deters us from exhausting the positive resources of the earth, favours pollution” (Hardin 1968).

In the light of the political legacy of Hardin’s article – owing to its dominant interpretation as a rationale for privatisation – it may seem bizarre that André Gorz understood it as “one of the most relevant refutation of the self-regulatory virtues of the market” (1988, p. 84). Yet, this reading is anything but far-fetched. Hardin’s argument is explicitly directed against *laissez-faire* and “the spirit of Adam Smith”. It shows that unrestrained exploitation of natural resources by rational profit-maximisers on a finite planet can only lead to ruin. It opposes to *laissez-faire* and individual freedom the necessity to strongly regulate actions that affect scarce resources – either through State coercion or through private control of a definite resource. The path of privatisation would indeed support the creation of a market and thus meet the views of (neo)liberals. Still, what Hardin values in privatisation is not the alleged self-regulation of the market as an impersonal mechanism, but the conscious control and regulation exerted by a private individual on a defined territory – which tends to mirror the figure of the Leviathan. He does not equate privatisation with market “freedom” but with private control, regulation, and mastery. Hardin’s obsession with scarcity leads him to call for the active regulation of many domains that can safely (and should) be left to individual freedom (e.g., procreation). Nevertheless, we may find some valuable lessons in his argument: foremost, the necessity to limit through collective regulations the economic exploitation of natural resources by rational

¹¹³ To “free-ride” is to adopt a non-cooperative behaviour which is rational from an individual’s perspective but generate sub-optimal collective results.

profit maximisers (capitalist firms essentially). The “tragedy of the commons” is an interesting scenario but it describes a situation of *laissez-faire*, not a commons since those are – by definition – collectively shared, managed and regulated resources. That scenario does not even seem limited to matters of resources: what is the resource involved in the international arms race that favours nuclear proliferation¹¹⁴ for instance? In addition, Hardin gives a curious example that further shows that his parable does not have much to do with commons. He denounces the “evils of the commons in matters of pleasure” which he illustrates by the fact that “advertisers muddy the airwaves of radio and television and pollute the view of travellers” (1968). That is precisely what any common(s) theorist or activist would denounce as the opposite of a commons: the enclosure (privatisation) of an unprotected public domain which is sold to advertisers as a commodity. This example of tragedy put forward by Hardin in his most famous text is actually a tragedy of enclosures.

Finally, Garrett Hardin clearly takes position in debates (B) and (C): it is a neo-Malthusian critique of cornucopianism insisting that technology cannot solve the contradiction between unlimited demographic growth and ecological limits; it is also a call for governments to force individuals to act within certain limits defined by technocrats in various domains. It thus exemplifies an authoritarian and technocratic form of ecologism.

The “Tragedy of the Commons” has had a tremendous echo in the decades following its publication. It became a fundamental concept of economic science and was proposed as an “essential reading in American university programs, not only in economics, but also in political science, sociology and other disciplines” (Bollier 2014, p. 35). The notion of “commons” came to be spontaneously associated to tragedy, chaos, and ruin. Whatever the limits of State and private property may be, they were presented as a lesser evil since “the alternative of the commons is too horrifying to contemplate” (Hardin 1968). In a context of rising neoliberal hegemony, economists largely privileged the option of private property. The tragedy of the commons comforted their belief in the virtues of private property as the central institution of modern economies, which enables to turn resources into commodities that can be freely traded on markets. It inspired new developments in economic research which reconceptualised property rights and insisted on their importance for an efficient and sustainable allocation of resources (Alchian et Demsetz 1973).

More importantly, Hardin’s essay and its neoliberal interpretation brought to the surface an old theoretical debate and political trauma of western societies – the enclosure movement. We have briefly presented the notion of primitive accumulation in the last sub-section of chapter 1. It was Marx’s answer to the question of the historical origins of the capitalist mode of production: how does large amounts of capital (e.g., money, lands, industrial means of production) get accumulated in the hands of a few men while the vast majority become “free” labourers, dispossessed from the means to provide to their own subsistence, and thus forced to sell their labour power on the market? How do we obtain the preconditions for capitalism that are accumulated capital and a proletariat? Marx’s explanation sharply contrasted with the one of most economists of his time, who used to answer with a fable in which a smart and hardworking

¹¹⁴ The international arms race represents a tragedy of the commons scenario: it is rational for each country to invest in military R&D, but it generates a sub-optimal collective outcome.

elite of men accumulated wealth while the mass of others remained poor due to their idleness. On the contrary, he described primitive accumulation as a massive and brutal movement of expropriation of the rural population of Great Britain by the dominant classes (the lords, the royal family, and Scottish chiefs of clan) that took place from the 16th to the 19th century, complemented by the exploitation of slaves and natural resources of the non-western world (1867a).

The movement of expropriation or enclosures was directed against both the private property of independent peasants and the traditional commons. The latter comprised two realities that may be uneasy to distinguish: resources that were collectively owned and managed by local peasant communities (e.g., pastures, forests, rivers, paths) and collective rights of local inhabitants over resources that were privately-owned – such as the right of commonage which allowed to make cattle graze on already harvested private fields (Dardot et Laval 2015, p. 360). Marx insisted on the distinction between private property based on personal labour and private property based on the exploitation of others' labour which characterizes capitalism:

“Political economy confuses on principle two very different kinds of private property, of which one rests on the producers' own labour, the other on the employment of the labour of others. It forgets that the latter not only is the direct antithesis of the former, but absolutely grows on its tomb only” (Marx 1867b, p. 543).

The enclosure movement is foundational to capitalism in that it separated workers from their means of production. Peasants could subsist by working the land they personally owned and using the commons, but as the lords expropriated them from and enclosed both, they were forced to go to cities in the hope to sell their labour force. While the private property of the immediate producer and the commons complemented each other, capitalist property emerged by enclosing both to exploit “free” labourers. It is essentially this distinction – and a particular understanding of the political meaning of property in the antique world – that inspired the one that Hannah Arendt made between “wealth accumulation” (characterizing capitalism) and “private property” (in which she saw a cornerstone of political citizenship and freedom): “the enormous and still proceeding accumulation of wealth in modern society, which was started by expropriation [...] has never shown much consideration for private property but has sacrificed it whenever it came into conflict with the accumulation of wealth” (Arendt 1958, p. 66-67). As stimulating as this distinction may be, it is a bit confusing in so far as it approaches property as a fixed, transhistorical concept. What is at stake in the enclosure movement, however, is a radical redefinition of the concept of property and of its extension which resulted in the commodification of land and labour. We have seen how the enclosure movement enabled the commodification of labour; we may now present its commodification of land.

In western Europe, under feudalism, property was governed by varied local customs and appeared as a juxtaposition of multiple rights that could belong to different individuals or groups:

“Property was not attached to a thing, but to its utilities, its products (we speak of an absence of ‘corporeity’ of property). In fact, this not only implied the absence of

right to alienate (abusus) but authorized the superposition (or juxtaposition) of multiple property or use rights over a same thing” (Orsi 2013).

The enclosure movement founded the modern notion of property as the absolute and exclusive right of an individual (a physical or moral person) over a thing, of a subject over an object. The modern notion of property tends to revive and radicalize the concept of property inherited from Roman law. The Roman concept of property (*proprietas* or *dominium*) depicts it as the complete power of an owner over a thing¹¹⁵ which comprises the *usus* (right to use), *fructus* (rights over the products or fruits), and *abusus* (right to misuse, destroy, or alienate by selling or giving, temporarily or definitively). William Blackstone’s definition of property forcefully illustrates the modern understanding of that notion. He defined it as “that sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe” (1766, p. 1). This modern understanding of property made it possible to transform land into a commodity that a person could freely exchange (alienate) on the market.

Over western Europe, the commons were under attack and enclosures progressed up to the mid-19th century. Physiocrats exerted a decisive role in the legitimation of this process, which they thought necessary to modernise agriculture. They considered that what is collective remains unproductive and promoted individual agrarianism as the only way to economic progress. The peasantry’s negative reactions and resistances were portrayed as economically illiterate. The arguments of Garrett Hardin or Alchian and Demsetz (1973) are reminiscent of these condemnations of the commons – which would encourage over-exploitation and under-investment. Many – if not most – economic historians still think that enclosures made a significant contribution to productivity growth in agriculture, which tends to outweigh the social trauma they represented. However, this view which was once unchallenged has been increasingly contested by scholars who suggest its contribution to productivity is very uncertain (Allen 1982) or that it was only one of the possible paths to productivity gains (Turner 1986). Before that, major socialist thinkers also considered that the movement of enclosures had been a tragic but necessary phase of economic modernisation. Karl Polanyi for instance, wrote that:

“In retrospect nothing could be clearer than the Western European trend of economic progress which aimed at eliminating an artificially maintained uniformity of agricultural technique, intermixed strips, and the primitive institution of the common. [...] These facts suffice to identify the change from arable land to pasture and the accompanying enclosure movement as the trend of economic progress” (Polanyi 1944, p. 39).

In spite of this recognition, Polanyi strikingly described the violence of the process in the preceding pages:

“Enclosures have appropriately been called a revolution of the rich against the poor. The lords and nobles were upsetting the social order, breaking down ancient law and custom, sometimes by means of violence, often by pressure and intimidation. They

¹¹⁵ However, the metaphysic opposition between subject and object was much less fundamental in the Roman context than in the modern one.

were literally robbing the poor of their share in the common [...] turning them from decent husbandmen into a mob of beggars and thieves” (Polanyi 1944, p. 37).

Karl Marx’s depiction of the enclosures in the last section of Capital Volume 1 (dedicated to primitive accumulation) is at least as distressing as the one of Polanyi. As Isabelle Stengers rightly remarked: “Marx did not celebrate that expropriation in the way he celebrated the destruction of corporations and of all that attached men to traditions and lifestyles: as the elimination of an ancient order, an elimination for which forthcoming socialism would be thankful to capitalism” (2013, p. 70). Still, the overall impression standing out of Capital is in line with the deterministic element in Marx’s works: the commons were a primitive institution condemned by history, their enclosures were necessary for capitalism to arise and develop the productive forces that would set the stage for the advent of communism. However, a very different regard on the commons and their enclosures was also expressed by Marx in some of his earliest and latest writings, one that is more in line with the revolutionary element of his work. In a famous series of youth articles for the *Rheinische Zeitung* (Marx 1842), he defended the traditional right of the poor to harvest dead wood in privately-owned land, against recent laws that prohibited this ancient practice to enforce a more modern and exclusivist conception of private property. More importantly, in the early 1880’s, following exchanges with Russian socialists (especially Vera Zasulich) he reached an important conclusion:

“Now the question is: can the Russian obshchina, though greatly undermined, yet a form of primeval common ownership of land, pass directly to the higher form of Communist common ownership? Or, on the contrary, must it first pass through the same process of dissolution such as constitutes the historical evolution of the West?”

The only answer to that possible today is this: If the Russian Revolution becomes the signal for a proletarian revolution in the West, so that both complement each other, the present Russian common ownership of land may serve as the starting point for a communist development” (Marx 1882).

In this text, Marx indicates that more than half of the land in Russia was then held in common by peasants through the multi-secular institution of the “*Obschina*”¹¹⁶, usually translated as “peasant commune”. A year before, in a letter to Vera Zasulich, he defended the same position and argued that the last section of Capital Vol. 1 “provides no reasons either for or against the vitality of the Russian commune” (Marx 1881). It only described the course of events as they occurred in England and as they would soon be reproduced in Western Europe. Whether that was an *a posteriori* reinterpretation of his own writings or the clarification of his initial argument does not matter much. What does on the contrary, is that in his latest writings, Marx did contend that in the Russian context at least, capitalism – rather than being a necessary historical phase to reach communism – could be side-stepped though the defence and

¹¹⁶ Definitions of the “*Obschina*” – a concept very close to the one of “*mir*” – slightly differ among scholars and the reality it refers to have probably been subject to local variations. Here is a rather consensual one extracted from a dictionary of Russian historical terms: “Peasant commune or community, predominantly in Great Russia. The distinctive characteristic of this organization was periodic redistribution and equalization of the arable lands among households, according to the number of male souls, or working hands, or eaters in each of them. After the distribution of plowlands each household managed its affairs on its own. This system of periodic redistribution of holdings became widespread in the 18th, and especially in the 19th, centuries” (Pushkarev 1970).

development of existing traditional commons. After having resisted for centuries to the reign of such people as Ivan IV and to events as devastating as World War I, the Russian “*obschina*” was finally destroyed in the 1930s by Stalin’s collectivisation policies, which stripped power away from the peasantry to concentrate it within the central bureaucracy. Unsurprisingly, the latter used the deterministic element in Marx’s works to legitimate the process.

Neoliberal enclosures and accumulation by dispossession

The notion of “enclosure” has been used to describe the processes of privatisation and dispossession that are central to neoliberalism. The reinforced exclusivism and new extension of intellectual property rights were famously described as a “second enclosure movement” directed against the “commons of the mind” by James Boyle: “once again things that were formerly thought of as common property, or as ‘uncommodifiable’, or outside the market altogether, are being covered with new, or newly extended, property rights” (Boyle 2008). In the year 1980, some major legal changes illustrating this new trend occurred in the US shortly after the election of Ronald Reagan: the Software Copyright Act, the Bayh-Dole Act, and the Supreme Court’s decision in the *Diamond vs Chakrabarty* case. We have seen earlier that the Software Copyright Act recognized the right to protect software under copyright law, which largely contributed to the rise of proprietary software and, in reaction, to the emergence of free software. The Bayh-Dole act has been a decisive step in the neoliberal transformation of scientific institutions. Responding to a request from chemical, pharmaceutical, and biotechnological firms, this law authorized universities to privatise the results of public-funded research by registering patents, often in collaboration with private companies. Consequently, enterprises started colonizing public research institutions (through public-private partnerships) and considering them as cheap R&D laboratories whose programs could be reoriented towards their commercial interests (Bollier 2014, p. 83). The ethos of scientific research based on disinterestedness, knowledge-sharing and collaboration was significantly eroded to the advantage of market-oriented values. Major results of public-funded research came to be routinely privatised by firms who would then sell them at lucrative prices: drugs against depression (Prozac, Zantac), hypertension (Enalapril, Captopril), and treatments against cancer (Taxol/Paclitaxel) or glaucoma (Xalatan) represent a few examples.

The Supreme Court’s decision in the *Diamond vs Chakrabarty* case legalised the registration of patents on living organisms. This radical change of patent law should be understood in relation with the rise of biotechnology since the 1970’s, which created new junctions between the domains of biology and technical innovation (subject to patenting). The decision to authorize patents on life disrupted the founding of patent law by blurring the frontier between invention and discovery. The US and other northern countries introduced intellectual property rights in the negotiations of the World Trade Organization’s Uruguay Round, which led to the signature of the agreement on TRIPS (Trade-Related Aspects of Intellectual Property Rights) by 164 countries in 1995. This agreement represented a quasi-universalisation of the new maximalist understanding of IP rights in multiple domains. It massively benefited to transnational firms of northern countries. Vandana Shiva has argued that patent systems represent “a drain of technology and wealth from the South to the North, not a mechanism for technology transfer from rich countries to poor countries” (Shiva 2001, p. 29). Indeed, in 1995, the US alone collected half the royalty fees in the world. Alongside, transnational firms of northern countries started to register patents on genetic resources from the global South, including plants that had already been used by local communities for centuries. Such practices have been denounced as “biopiracy” and led to many legal and political battles.

The notion of “enclosure” has been used to describe the privatisation and commodification of multiple resources beyond the realm of IP rights – which essentially concerns science, culture, and biodiversity. Water is an essential battleground. Transnational companies are privatising aquifers and water management around the world to turn water into a commodity. The Cochabamba water war of 2000 represents a famous example. The World Bank and an international consortium led by the firm Bechtel pressured local authorities to privatise the water management of Cochabamba, Bolivia’s third largest city. Supporters of the water enclosure argued that the consortium would make large investments to renew the water networks, which would improve water access for everyone, including poor households. However, the privatisation contract planned a 50% raise in water prices and even prohibited the collect of rainwater on rooftops (Bollier 2014, p. 59). The mass social movement that followed finally succeeded to get it cancelled.

Land-grabbing is another major issue, which more closely resembles the historical British enclosure movement. Foreign companies and governments are buying millions of hectares of land on which local communities have been living for generations, in Africa, South America, and Asia. These communities do not have formal property rights over their land, but only customary use rights. It is their national governments that are the formal owner. And these governments – often authoritarian and corrupted – tend to sell those lands to foreign investors to make revenues. Across the globe, 2 billion people and 8.5 billion of hectares are estimated to depend on customary use rights that remain under the threat of land-grabbing. Public spaces are also being privatised and commodified in multiple ways. Squares and parks that enabled people to meet, discuss and demonstrate are being turned into shopping malls, luxury hotels and business districts – the Gezi Park protests that took place in Istanbul (Turkey) in 2013 is a famous example of resistance to this trend. Public authorities are also selling private firms the right to name all sorts of infrastructures after their trademark: hence the emergence of the Coca-Cola Stadium in Xi’an (China), the Mr. Price Kings Park Stadium in Durban (South Africa), the AccorHotels Arena in Paris (France), or the Vodafone Sol metro station in Madrid (Spain).

The term “enclosure” has not only been used metaphorically to describe and criticise privatisation processes. Some Marxist authors such as David Harvey (2004) turned it into an analytical concept. Marx presented primitive accumulation as a phase preceding and preparing industrial capitalism. Contrarily to Proudhon (1840), who understood capitalist exploitation as a form of theft supported by private property, Marx – as we saw earlier¹¹⁷ – understood it as resulting from the rational functioning of the capitalist market. Every commodity is sold at its value, including labour power, but this commodity has the peculiarity to produce surplus-value when it is used. However, Marx considered that theft, plunder, and fraud precisely characterized primitive accumulation. It was a phase of extra-economic violence which prepared the stage for capitalism, which then exerted its economic violence through the rational exploitation of labour. Building on a previous analysis of Rosa Luxemburg (1913), David Harvey contends that the extra-economic violence and plunder associated to primitive accumulation has never really ceased. Alongside accumulation by expanded reproduction of capital (based on exploitation), he argues that “accumulation by dispossession” has always persisted and has even become

¹¹⁷ Chapter 1, Andrew Feenberg’s *Critical Constructivism, Technosystem*

dominant under neoliberalism. While accumulation by expanded reproduction is productive; accumulation by dispossession only redistributes pre-existing wealth. Accumulation by expanded reproduction regards the peaceful exchange of commodities between formally equal individuals. Its most important moment occurs within the productive sphere where the exploitation of labour by capital produces surplus-value. Accumulation by dispossession on the contrary, mainly concerns the relation between capitalism and its outside: its appropriation of resources owned by states, communities, or considered outside the property system. It mostly concerns the inclusion of new resources within the realm of private property and commodity exchange¹¹⁸. However, Harvey also uses this notion to describe the appropriation of resources that were already within the market system, and belonged to smaller capitalists, immediate producers, or individuals; thus, pointing to the concentration of capital, rather than the expansion of capitalism. The inclusion of this last meaning marks a notable difference with the use of the term “enclosure” made by most authors who denounce them (e.g., David Bollier, James Boyle).

Dispossession is a common phenomenon in human history which has existed prior and beyond capitalism, but which played a major role in its evolution. The State, with its monopoly on violence and on the definition of legality, has given a critical support to processes of accumulation by dispossession. It did so during the primitive accumulation described by Marx, by supporting the expropriation of the English peasantry as well as the imperial conquests of other continents, the plundering of their resources and the enslaving of their people. It continued to do so through its support to various forms of imperialism, colonialism, and neo-colonialism. And it has massively done so with the rise of neoliberalism, by giving away the assets that it formally owned on behalf of the national community (e.g., public companies, services, universities, urban and natural spaces, infrastructures), selling them at discount prices to private firms, or by imposing private health and pension systems, and by creating new forms of (intellectual) property. If we take a few seconds to consider the quantity and value of public assets that have been privatised since the 1980’s, not only in western, but also in post-soviet countries and in China, the breadth of contemporary enclosures appears utterly breath-taking. The neoliberal state also redistributes wealth to the dominant class through fiscal policies (Harvey 2007, p. 164) that reduce taxes on capital income (e.g., dividends, interests), provide vast arrays of subsidies and tax breaks to corporations, reduce the progressivity of indirect taxes and raise direct taxes such as the value-added tax (which by principle affect indifferently the rich and the poor) etc. Furthermore, if accumulation by dispossession has become the dominant modality of accumulation under neoliberalism, it largely results from the rise of finance capital according to Harvey. Indeed, the latter constitutes a powerful lever of spoliation and fraud he argues:

“Advertisement for unguaranteed stock investments, speculation-related scams (pyramids, ponzi schemes), organized destruction of assets through inflation, appropriation of assets through mergers and acquisitions, creation of high levels of debt reducing entire populations – even in advanced capitalist countries – to the condition

¹¹⁸ We have argued above that data should be understood as raw materials captured by capitalist platforms, rather than as products of a digital labour which they would be exploiting. This amounts to understand the capitalist capture of data as a form of accumulation by dispossession.

of permanent debtors, not to mention asset disposessions (pension funds attacked, then destroyed after stock market crash) through manipulations of credit and stock exchange: here lies some essential particularities of contemporary capitalism. Enron's bankruptcy deprived many people from their means of subsistence and pension rights. Nevertheless, what matters most is to consider the speculative attacks led by hedge funds and a whole range of major institutions of finance capital, as the spearhead of modern accumulation by dispossession" (Harvey 2004).

Post-operaists do not reject the concept of accumulation by dispossession but question its opposition to the one of accumulation by expanded reproduction. In their view, since capitalist exploitation increasingly takes the form of an *a posteriori* extraction over an autonomous productive process, it is becoming another form of dispossession. We have already criticized this thesis and highlighted its proximity with Proudhon's understanding of capitalist exploitation as theft. Thus, I consider accumulation by expanded reproduction and accumulation by dispossession as two heuristic and separate concepts.

David Harvey also developed his concept for strategic reasons. Considering that the labour movement has been largely weakened, he suggests the dispossessed could represent a new macro-social subject of opposition to capitalism, that would replace the figure of the exploited. Dardot and Laval (2015, p. 131-136) point out the limits of this argument by arguing that critical theory and political action should rearticulate the struggles against exploitation with the ones against dispossession, rather than dissociate them and privilege one over the other. They rightly insist that "the extension and the deepening of capitalist relations go hand in hand" (2015, p. 133). Indeed, the reference to the English enclosures should remind us that dispossession, by constantly separating people from their means of production, subsistence, and autonomy outside wage labour, systematically reinforce their dependence and submission to capital at work. When access to non-market goods and services is undermined or prohibited through diverse forms of dispossession¹¹⁹, individuals become more dependent on the money they earn at work. New forms of management in private companies and public administrations have also exacerbated exploitation, pressure, and reshaped subjectivities. Dardot and Laval insists that such transformations ought to be resisted and that organized wage workers still constitute a stronghold of resistance which should not be neglected and could rise again. They also suspect that the sole insistence on struggles against dispossession risk to remain limited to small isolates of autonomy (e.g., free software, illegally occupied spaces) which would survive on the fringe of capitalism but leave the heart of the exploitative system untouched.

I agree with Dardot and Laval's argument: struggles against exploitation remain crucial and should not be neglected but articulated with those against dispossession. Yet, a quick overview

¹¹⁹ Ivan Illich's concept of radical monopoly pointed to an interesting form of dispossession: "By "radical monopoly" I mean the dominance of one type of product rather than the dominance of one brand. I speak about radical monopoly when one industrial production process exercises an exclusive control over the satisfaction of a pressing need, and excludes nonindustrial activities from competition. [...] That motor traffic curtails the right to walk, not that more people drive Chevies than Fords, constitutes radical monopoly" (1973, p. 72).

The prohibition to collect rainwater on rooftop by Bechtel, the imposition of powdered milk by Nestlé in many developing countries (Save the Children 2018), as well as many technical and legal restrictions on software and hardware use, modification and reparation by users may be assimilated to this form of dispossession.

of the most powerful social movements of the years 2018-2020 show that most of them started as struggles against dispossession: against an allegedly “green” tax in France, a tax on WhatsApp calls in Lebanon, a raise in public transport prices in Chile etc. The fact that these struggles do not properly start from “within” capital, at work, does not mean that they are condemned to search for autonomy outside the capitalist technosystem. A struggle might end up very far from its starting point. The French yellow vests for instance, started from an outrage against a modest tax reform, before developing as a nation-wide social movement that came to question – and attempted to re-found – the entirety of political and economic institutions of the concerned country. One of its central mode of action was the blockading of roads and highways, which indirectly slows down production by hampering circulation, and thus, can serve the same objective as strikes in a context where they have become increasingly costly and ineffective (Jeanpierre 2019).

Commons

The reference to the commons and enclosures became central within the social movements that emerged in the 1990's to contest neoliberal globalization. The terms "commons", "common goods", and sometimes "common" (as an adjective or a noun) were raised as a banner around which the "movement of many movements" or the "coalitions of coalitions" (Klein 2001) contesting the on-going globalization would unite. Initially described as "anti-globalization" in the US media (Graeber 2002), these movements soon rejected that label to prefer the one of "alter-globalization". Indeed, their struggles, ideals, practices, and alliances transcended frontiers and were not so much directed against globalization as they were against neoliberalism. They called for an alternative world order based on other principles than market competition, profit, and the unlimited exploitation of men and nature. Since they were sociologically, culturally and ideologically diverse, geographically dispersed, and refused to be structured on a traditional bureaucratic model, they had to develop at least a common language and a minimal understanding of what they fought for and against. The emergence of the political discourse of the commons largely owes to these efforts.

Many activists and movements started to depict neoliberalization by insisting on one of its essential traits: the private appropriation of multiple resources that were formerly owned by states, communities, or beyond the property system. The multiple processes of privatisation and commodification promoted by neoliberalism were compared to the historical episode of the English enclosure movement. According to Naomi Klein (2001), these processes are not limited to the privatization of such things as education, healthcare, or natural resources, but also include "the way powerful ideas are turned into advertising slogans and public streets into shopping malls; new generations being target-marketed at birth; schools being invaded by ads; basic human necessities like water being sold as commodities" etc. She thus defined the alter-globalization movement as a movement to "reclaim the commons": "People are reclaiming bits of nature and of culture, and saying 'this is going to be public space'" (2001). On the one hand, the commons paradigm has a defensive dimension meant to denounce the new enclosures. This dimension leads to declare that some resources are "not for sale" (e.g., water, food, nature, health, knowledge), that they are unalienable and cannot be treated as commodities:

"To talk about the airwaves, the Internet, wilderness areas and scientific literature as commons is to say, in effect, that these resources belong to the American people (or to distinct communities of interest) and that they therefore ought to have the legal authority to control those resources. To talk about the commons is to say that citizens (or user communities) are the primary stakeholders, over and above investors, and that these community interests are not necessarily for sale" (Bollier 2007).

On the other hand, the commons paradigm has an offensive dimension which promotes practices of "commoning" developed between the users of shared resources, enabling the emergence of new social relations and more democratic models of governance. It opposes neoclassical economics by insisting that wealth is not only produced by capitalist enterprises competing on the market, but also – if not primarily – by communities sharing, governing, and producing resources outside the market system: "The commons paradigm does not look primarily to a system of property, contracts and markets, but to social norms and rules, and to

legal mechanisms that enable people to share ownership and control of resources” (Bollier 2007). The commons terminology rapidly spread among environmentalists (Buck 1998; Ecologist 1993), who usually gave it a slightly different meaning: rather than calling for an equal access to resources and their democratic management, they emphasized the importance of “global commons” (e.g., biodiversity, atmosphere, oceans) that required to be protected from unlimited exploitation through access and use restrictions.

The commons discourse reformulates the principle of autonomy whose value is potentially universal and which has been central to emancipatory movements around the world since its first emergence in ancient Greece¹²⁰. Nonetheless, it does so in specific terms that are strongly related to the particular historical context of the 1990’s/2000’s and more generally, of what we have described as the digital age. It strongly inherits from the ideas and practices of the libertarian socialist political tradition which promoted autonomy and self-management in the industrial age, although it often comes in much less radical (anti-capitalist and anti-statist) versions. As we have said, the commons discourse largely emerges as a defensive response against the privatisation and commodification processes promoted by entire generations of neoliberal economists who were taught that commons inevitably conduct to ruin, while private property always represents the reasonable solution. Significantly, the commons/enclosures opposition avoids posing public-statist property as the alternative to private property. This relative distrust in the State can be explained by different contextual reasons. On the one hand, the collapse of the Soviet Union and the orthodox Marxism associated to it definitively discredited State-based bureaucratic socialism as an alternative to capitalism. On the other hand, the State was profoundly reshaped by neoliberalism. The State’s bureaucratic apparatus was re-designed according to entrepreneurial norms, managerial methods coming from the private sector were introduced to promote internal competition at every level, new quantitative evaluations and requirements of productivity. Governments increasingly saw their mission as creating the institutional conditions that would be the best able to attract foreign investments, rather than responding to the main demands expressed in civil society. The dominant class from the public and the private sectors became increasingly tied, while professional careers switching from one to the other became more and more common. All these elements created the conditions for a crisis of representative democracy by reducing the responsiveness and accountability of elected officials, and radically deepening the (already existing) sociological and ideological gap between representatives and those they are meant to represent. Furthermore, governments massively privatised the public properties under their supervision, often doing so against the will of the majority of the national communities to which these assets belong.

The commons discourse also tends to respond to neoliberalism by insisting that man is not a homo economicus, a rational enterprise in competition with others for profit-maximization (Bollier 2014, p. 111). On the contrary, it views man as a social being included in a specific culture and environment, with values and motivations that are complex, heterogeneous and non-fungible in a single quantitative measure (utility, or even, money). These various values and motivations render possible altruistic and cooperative behaviours that are hardly imaginable from the perspective of neoliberal anthropology.

¹²⁰ See Chapter 1, Autonomy, Autonomy and the imaginary institution of technology.

It is also in that context, that new activist alliances were attempted against the enclosures of information commons carried out by the transnational firms embodying the first dominant business model of cognitive capitalism (Aigrain 2003). The critique of intellectual property created a common enemy between groups as distinct as hackers promoting free software and farmers unions in favour of non-proprietary seeds. The eclipse of orthodox Marxism and the rise of environmentalism also contributed to discredit the epic narratives of progress, which had founded modernity, and obstructed such convergences. Precapitalist institutions of solidarity such as community-owned lands or forests were regarded with less disdain, and some groups considered the resistance against their enclosure to be as important as the one against the enclosure of culture, software or public health (Sultan 2011). It is also in that context that André Gorz (2007) complemented his critique of industrial technology with an influential promotion of the emancipatory potential of the convergence between low-techs and digital technologies. Overall, the reference to the commons and enclosures in political discourse tends to express a new attitude towards the categories of progress and modernity. In addition, a “structural affinity” between the internet and the new forms of activism associated to the alter-globalist movement has sometimes been noted (Granjon 2001, 2005). It not only owes to the promotion of information circulation against intellectual property, but more importantly, to the movement’s decentralized and horizontal structuration through networks of diverse small organizations: “Rather than forming a pyramid, as most movements do, with leaders up on top and followers down below, it looks more like an elaborate web” (Klein 2001). A rearticulation of the local and the global was often envisioned on this base: the local gets valued as a space for democratic participation and cultural singularity, while digital technologies should support the global interconnection and solidarity between multiple entangled communities disseminated around the world. Alter-globalism tends to portray neoliberal globalization as a force of uniformization, and in reaction, to praise biological and cultural diversity.

The commons discourse did not only develop through the political activism of various groups more or less related to alter-globalism. It also developed through major scholarly and theoretical works which now compose an imposing literature. Elinor Ostrom’s “*Governing the Commons*” (1990) represents a milestone in this respect. This book synthesized and theorized numerous empirical case studies realised around the world by Ostrom and other researchers, regarding common-pool resources (e.g., pastures, fisheries, forests, rivers, irrigation systems...), that is resource systems which are both composed of rivalrous resource units (e.g., fish, wood, water...) and characterised by the difficulty to exclude potential users. It forcefully refuted the argument of the tragedy of the commons, by showing that the pasture imagined by Hardin does not correspond to a common, but to a regime of open access. Indeed, a common-pool resource can be managed through various regimes (and mixtures of these regimes): a state-based regime of public property, a market-based regime of private property, a common property regime or an open access regime. A regime of common property substantially differs from open access: it implies that the resource is managed by a community through rules. A common can thus be defined as a resource which is shared and managed by a community through the rules it creates (Bollier 2014, p. 27). Ostrom’s empirical research demonstrated that under certain conditions, common-pool resources can be governed much more efficiently as commons than they would be through private property or state control.

The works of Elinor Ostrom and researchers from the Indiana University of Bloomington on natural commons, were followed in the late 1990's/early 2000's by the ones on information commons developed by legal scholars opposing the reinforced exclusivism of IP rights such as Lawrence Lessig, Yochai Benkler or James Boyle. Ostrom demonstrated that natural resources that are rivalrous and subject to risks of over-exploitation are often better managed as commons than as private property. Information commons on the contrary are non-rivalrous and subject to risks of under-investment: if creators lack the ability to exclude, they will not be able to charge and thus are considered to have inadequate incentives to create. The legal scholars promoting information commons have insisted that the reinforced exclusivism of IP rights often hamper creation, rather than stimulate it, since it reduces access to the main input for the creation of informational goods, which is information itself (e.g., code, scientific articles, images, songs, words). Natural commons and information commons appear as the two main paradigmatic types of commons and they have concentrated much of the scholarly attention. Their academic study developed separately at first, but ties progressively developed following the invitation of Elinor Ostrom to a conference organized by James Boyle in 2001 (Broca et Coriat 2015). Beyond these two groups of researchers, many other works were developed on commons, sometimes including them in more global and radical political projects.

The various political and scientific uses of terms such as “commons”, “common”, “common goods”, or “common good” have generated much confusion and ambiguities around these notions. It has even encouraged businesses to recover some of these to the point that commons activists and theorists now denounce the risks of “commonswashing” (Dulong de Rosnay 2019). I will avoid the term “common good” in the singular which is sometimes used as a synonym of “justice” or “general interest”: since there are multiple conceptions of justice, this term does not have a definite political content or unequivocal meaning. I will also prefer the term “commons” to the expression “common goods” which tends to insist too much on the resource, while obscuring the fact that a common inextricably associates a resource to a community and the rules it institutes. The ambiguities surrounding the notion of commons also owes to the rich literature about them, which is characterized by a variety of competing definitions, theoretical frameworks, normative views etc. Political theorists such as Michael Hardt and Antonio Negri (2009) on the one hand, and Pierre Dardot and Christian Laval (2015) on the other, have also made major contributions to the debate by developing theories of “the common” in the singular. The next chapter will present and discuss some of the main theories of the commons in the plural and the common in the singular. It will propose a typology of theories of the common(s), address criticisms to different theories and develop a theoretical and normative position based on the one of Dardot and Laval.

Chapter 3: Theories of the Common(s)

“Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past.”

Karl Marx, *The 18th Brumaire of Louis Bonaparte*, 1852

“Communism is for us not a state of affairs which is to be established, an ideal to which reality [will] have to adjust itself. We call communism the real movement which abolishes the present state of things. The conditions of this movement result from the premises now in existence.”

Karl Marx and Friedrich Engels, *The German Ideology*, 1845

While chapter 1 discussed the question of technology and its relations to autonomy in the industrial age, and chapter 2 proposed a historico-conceptual overview of the emergence of the digital age and of the commons discourse; chapter 3 frontally engages with the theories of the common(s). A commons may be minimally defined as a resource shared and managed by a community through the rules it creates (Bollier 2014, p. 27). Beyond this consensual definition, there are considerable divergences between theories of the commons in the plural and of the common in the singular on a series of issues: normative and strategic views, legal and economic frameworks of analysis, social ontologies and anthropologies, theories of history etc.

The structure of this chapter provides a typology of theories of the common(s) which builds on the ones developed by Papadimitropoulos (2017, 2020) and Giuliani et Vercellone (2019). Papadimitropoulos classifies theories of the common(s) in three types: liberal, reformist and anti-capitalist. Considering reformist theories of the commons (Kleiner 2010; Kostakis et Bauwens 2014) also seek to surpass capitalism (only through non-revolutionary means), I prefer to draw the main line of division between liberal and anti-capitalist theories. Among the many possible ways to subdivide the anti-capitalist theories, I find particularly interesting to follow

Giuliani and Vercellone's distinction between theories of the common(s) as a mode of production and the theory of the common as a political principle. The theory of the common as a political principle, developed by Dardot and Laval (2015), has affinities with Castoriadis' theory of autonomy which are so deep that I tend to see it as a reformulation and revision of the latter; whereas theories of the common(s) as a mode of production (Hardt et Negri 2009; Kostakis et Bauwens 2014; Rifkin 2014)¹²¹ are closely related to the ideas of the late Gorz and keep important elements of Marx's theory of history. On the one hand, the common is understood as a political principle that is central to today's social struggles and should inspire a refoundation of political and economic institutions; on the other hand, the common(s) represent a new mode of production, which develops within capitalism and may surpass it, rather as capitalism developed within the feudal order to overcome it. My intention is not to exacerbate this difference and suggest an insurmountable incompatibility between these two approaches to the common(s): on the contrary, the theory of Hardt and Negri for instance, is much closer politically to the one of Dardot and Laval than to the one of Rifkin. My insistence on this distinction is solely meant to develop a heuristic line of questioning of anti-capitalist theories of the common(s). One that may shed light on their understanding of the "social-historical" and their relation to the deterministic element in Marx's theory of history.

I will start by critically discussing two major liberal theorists of the commons: Elinor Ostrom, whose work is mainly centred on natural commons, and Yochai Benkler, whose work is centred on digital commons and the concept of commons-based peer production. I will then analyse different theories of the common(s) as a mode of production, that each embody a singular perspective on the transition to post-capitalism: the reformist perspective is illustrated by the works of Michel Bauwens and Vasilis Kostakis, the revolutionary perspective is illustrated by the works of Michael Hardt and Antonio Negri, and the techno-determinist perspective is illustrated by the works of Jeremy Rifkin. Finally, I will discuss Pierre Dardot and Christian Laval's theory of the common as a political principle and explore the ways in which it may fit with the claims I have made so far.

¹²¹Alfonso Giuliani and Carlo Vercellone developed the category of the common as a mode of production essentially to refer to the approach they share with Michael Hardt, Antonio Negri and other post-operaist authors. They did not explicitly include Michel Bauwens and Vasilis Kostakis within the category and would certainly not include Jeremy Rifkin. My use of the category is thus different and larger than theirs. I think it remains legitimate, in spite of the massive divergences between Rifkin and Hardt & Negri for instance, in that these theories all share the idea that the common(s) should be approached as a mode of production developing within capitalism to surpass it.

Liberal theories of the Commons

Liberal theories of the commons inscribe themselves in the tradition of political liberalism. Political liberalism promotes negative freedom against possible state encroachments. It does not seek to abolish the state, but considers its legitimacy rests on what it sees as its essential role: “to secure the freedom of individuals on a formally egalitarian basis” (Brown 2003). A liberal political order is compatible with either liberal¹²² or social-democratic (e.g., Keynesian) economic policies (Brown 2003). Arguably, it is even compatible with a form of democratic socialism (Rawls 2001, p. 138), but this issue exceeds our concern here. Indeed, the category of “liberal theories of the commons” is meant to refer to theories considering that commons are and should remain compatible with capitalism and the state within a liberal political order. David Bollier speaks for all of these theories when he declares:

“I do not believe that the commons and the market are adversaries. What is usually being sought is a more equitable balance between the two. Markets and commons are synergistic. They inter-penetrate each other and perform complementary tasks. [...] Businesses can flourish only if there is a commons (think roadways, sidewalks and communications channels) that allow private property to be balanced against public needs. Privatize the commons and you begin to stifle commerce, competition and innovation as well as social and civic needs. To defend the commons is to recognize that human societies have collective needs and identities that the market cannot fulfil by itself” (2007).

Beyond David Bollier, the main liberal theories of the commons are associated to, on the one hand, Elinor Ostrom and the school of Bloomington, on the other hand, the group of legal scholars engaged against the recent extensions of intellectual property (Lawrence Lessig, James Boyle, Yochai Benkler, Eben Moglen etc.). In the following pages, I will discuss the works of Elinor Ostrom and Yochai Benkler.

¹²² I only speak of liberal economic policies here, since it is unclear to what extent a liberal political order is compatible with neoliberalism. As we have seen, neoliberalism is more than a simple set of economic policies, it is an ideology which has profoundly reshaped the capitalist technosystem and the societies in which it is immersed by promoting a new norm of life based on competition between homo economici. Wendy Brown (2003) has argued that neoliberalism was incompatible with political liberalism and that it would progressively erode the foundations of the liberal political order. The fact that, after 40 years of neoliberalism, authoritarianism is on the rise around the world, including in countries that have founded liberal democracy (from Macron’s France to Trump’s United States), provides some empirical support to her thesis.

Elinor Ostrom's political economy of the commons

Elinor Ostrom's ground-breaking book, "*Governing the Commons*" (1990), as well as a good amount of her later works, have focused on the analysis of common-pool resources. A common-pool resource is a type of economic good that Elinor and Vincent Ostrom (1977) have identified. The classic typology of economic goods developed by Paul Samuelson (1954) and Richard Musgrave (1959) classified all goods that humans could use as either private or public goods based on the sole criterion of excludability. Public goods are intrinsically non-excludable which makes them difficult or impossible for private companies to sell as a commodity on the market. Street lighting, clean air, national security, lighthouses or a firework show on national holiday for instance, cannot be provided efficiently by the market. They represent market failures and standard economic literature recognizes the legitimacy of government intervention to subsidize or directly produce such goods. Elinor and Vincent Ostrom introduced the criterion of subtractability (or rivalry) to reach a more sophisticated typology of economic goods:

		SUBTRACTABILITY	
		<i>Low</i>	<i>High</i>
EXCLUSION	<i>Difficult</i>	Public goods Useful knowledge Sunsets	Common-pool resources Libraries Irrigation systems
	<i>Easy</i>	Toll or club goods Journal subscriptions Day-care centers	Private goods Personal computers Doughnuts

*Adapted from V. Ostrom
and E. Ostrom 1977*

The resulting typology highlights the fact that the excludability and subtractability of economic goods should be understood in terms of degrees (from low to high, or easy to difficult). It also recognizes the existence of two other types of goods¹²³: club goods and common-pool resources. A common-pool resource is "a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use" (Ostrom 1990, p. 30). Not only is it costly to exclude individuals from using the common-pool resource, but the latter is composed of rivalrous resource units. A variety of natural resources have the characteristics of common-pool resources: fisheries, forests, grazing lands, irrigations systems etc.

Ostrom is concerned with the collective action problems which arise in relation to common-pool resources (CPR). Among them, "provision problems" are similar to what occurs in relation to public goods: since it is costly to exclude potential beneficiaries, the latter are tempted to free-ride by avoiding to contribute to the provision and maintenance of the good. "Appropriation problems" however, which may lead to congestion, over-exploitation and destruction of the good, are specific to CPRs since they result from their rivalrous character.

¹²³ The notion of club goods had previously been developed by James Buchanan (1965), while the notion of common-pool resources was created by Vincent and Elinor Ostrom (1977).

CPR appropriators – those who withdraw resource units from a CPR – are in a situation of interdependence. That is, they are jointly affected by everything they do: if an appropriator enhances the resource system (by repairing a part of an irrigation infrastructure for instance) all others will benefit from it without having to help, and if he extracts more resource units (e.g., water, fish, wood) than is sustainable, the resource system might be damaged for all. In this context, if appropriators act independently by following their immediate self-interest, their returns will be inferior to what they could have achieved had they coordinated their strategies: each appropriator will avoid contributing to the improvement of the system, while trying to extract as much units as possible. The CPR will thus get damaged and eventually destroyed. In short, the CPR situation is one of interdependence in which independent action leads to suboptimal results for everyone – in the long-term at least. The question therefore is the following one: how can appropriators organize and govern themselves to produce continuing joint benefits when they all face the temptation to act opportunistically?

Three influential models have fuelled pessimism about the ability of individuals using common-pool resources to self-govern: Garrett Hardin's tragedy of the commons, the prisoner's dilemma game, and Mancur Olson's logic of collective action. They all suggest that individuals are caught in an inexorable process leading them to overexploit their resources, that they will keep acting independently and remain unable to coordinate their strategies. The only solutions available to avoid the tragedy would be either privatisation or government regulation. Ostrom recognizes that these models can be of interest in some specific situations which perfectly fit with their assumptions. Yet, she denounces the harm resulting from their ungrounded generalization to countless other settings in which self-organization may produce more effective results than regulation by external authorities or privatisation. The tragedy of the commons for instance, discusses a regime of open access rather than a collectively-managed CPR. It assumes that there can be no communication between resource users, that they are rational individuals purely focused on their immediate self-interests, that they do not share cultural norms which may favour altruistic behaviour etc.

It is essentially based on such theoretical models – rather than on empirical evidence – that economists and policy analysts have rejected for a long time the idea that local communities could efficiently manage natural resources. At the same time, “both the centralizers and the privatizers frequently advocate[d] oversimplified, idealized institutions – paradoxically, almost ‘institution-free’ institutions” (Ostrom 1990, p. 22). Calling for the privatization or the central regulation of a common-pool resource does not represent much more than a metaphor in Ostrom's view, telling us nothing about the concrete way in which these institutions (private property rights or central administrations) should be designed and enforce their rules¹²⁴. Such abstract prescriptions have sometimes had dramatic consequences. They led many countries of

¹²⁴ « An assertion that central regulation is necessary tells us nothing about the way a central agency should be constituted, what authority it should have, how the limits on its authority should be maintained, how it will obtain information, or how its agents should be selected, motivated to do their work, and have their performances monitored and rewarded or sanctioned. An assertion that the imposition of private property rights is necessary tells us nothing about how that bundle of rights is to be defined, how the various attributes of the goods involved will be measured, who will pay for the costs of excluding nonowners from access, how conflicts over rights will be adjudicated, or how the residual interests of the right-holders in the resource system itself will be organized” (Ostrom 1990, p. 22).

the global South (e.g., Thailand, Niger, Nepal and India) to nationalize the ownership of forests, and thus, to expropriate many communities who had owned and regulated them for generations. As governments did not have sufficient means to properly enforce their regulations¹²⁵, “the consequence was that nationalization created open-access resources where limited access common-property resources had previously existed” (Ostrom 1990, p. 23). Similar scenarios have occurred in regard to fisheries, land, or water resources.

Elinor Ostrom gathered and analysed a series of empirical case studies in which individuals have succeeded or not in avoiding a “tragedy of the commons” scenario through the development of institutions to self-govern CPRs. Her work brought striking evidence that CPRs could, in many cases, be effectively managed by local populations through common-property regimes. To take only this example, she reminds that in Japan, according to the estimates of Margaret McKean (McKean 1986) “about 12 million of hectares of forests and uncultivated mountain meadows were held and managed in common by thousands of rural villages during the Tokugawa period (1600-1867) and that about 3 million hectares are so managed today” (Ostrom 1990, p. 65). No case of ecological destruction has ever been recorded regarding all these common lands. A closer look at three Japanese villages (Hirano, Nagaike, Yamanoka) showed that villagers owned some lands as private property and others as common-property. The fact that the two property regimes have coexisted for centuries, during which their comparative advantages have been carefully weighed by peasants, shows that common property was not an anachronistic vestige. On the contrary it was wilfully preserved because it was better suited to local needs when: (1) the value of production per unit of land is low, (2) the frequency or dependability of use or yield is low, (3) the possibility of improvement or intensification is low, (4) a large territory is needed for effective use, and (5) relatively large groups are required for capital-investment activities.

Each Japanese village was governed by an assembly, usually composed of the heads of every household. Village assemblies created detailed rules regarding the quantity of each valued product (e.g., timber, thatch, fodder, decayed plants) a household could harvest from the commons and under what conditions. These rules were tailored to match specific environmental conditions, the role played by each products in the local economy, and the need to minimize the costs of monitoring. Each household also had an obligation to contribute a share of the collective work required to enhance and maintain the yield of the commons. Monitoring and sanctioning systems differed from a village to the other. Most villages hired “detectives” that patrolled the commons looking for unauthorized users, while some villages established a regular rotation between young men that would successively take on this role. Rule compliance was very high, but violations occurred and were sanctioned through penalties ranging from a small fine to complete ostracism, depending on the seriousness of the offense and the past behaviour of the offender.

Elinor Ostrom’s demonstration does not only prove that common-property regimes may sometimes represent a viable alternative to government regulation or privatisation. It also argues that “many successful CPR institutions are rich mixtures of ‘private-like’ and ‘public-like’ institutions defying classification in a sterile dichotomy” (1990, p. 14). Her intention is

¹²⁵ They could not employ enough foresters and gave them salaries so low that they would often accept bribes.

not simply to oppose common-property regimes to other strictly private or statist forms of property and governance, but to highlight the complexity and mixed nature of most institutional arrangements (Chanteau et Labrousse 2013). Her discussion of the governance of water basins in California for instance (1990, p. 103-142), showed that various public and private actors can manage to act collectively, by developing a polycentric (rather than centralized) governance system to avoid a tragedy of the commons scenario. The latter consisted in a “pumping race”: the immediate interest of each private or public company was to maximize its own water extraction, which would ultimately destroy the basin.

“In other words, diverse private and public actors have extricated themselves from the perversity of the pumping race and transformed the entire structure of the incentives they face. Public arenas were involved in many stages of these developments. The initial steps were taken in the shadow of a court order. Elections and public hearings were held at key stages. The solutions to the pumping race, however were not imposed on the participants by external authorities. Rather, the participants used public arenas to impose constraints on themselves” (Ostrom 1990, p. 110).

Curiously, in this case study the appropriators acting collectively to self-govern their CPR and avoid its destruction, are not individuals belonging to a community anymore, but private (and public) water companies. The strict parallelism between the analytical treatment of individuals and private enterprises in this case, is rather revealing of Ostrom’s anthropology and framework of analysis (which will be discussed in next sub-section) based on rational choice theory. Moreover, the comparison between successful¹²⁶ and unsuccessful cases of self-governed CPR institutions, enabled Ostrom to identify eight “design principles” that represent essential elements or conditions “that helps to account for the success of these institutions in sustaining the CPRs and gaining the compliance of generation after generation of appropriators to the rules in use” (1990, p. 90).

The eight design principles are listed in this table, extracted from Ostrom’s book (1990, p. 90):

Table 3.1. *Design principles illustrated by long-enduring CPR institutions*

1.	Clearly defined boundaries Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.
2.	Congruence between appropriation and provision rules and local conditions Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money.
3.	Collective-choice arrangements Most individuals affected by the operational rules can participate in modifying the operational rules.
4.	Monitoring Monitors, who actively audit CPR conditions and appropriator behavior, are accountable to the appropriators or are the appropriators.
5.	Graduated sanctions Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both.
6.	Conflict-resolution mechanisms Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7.	Minimal recognition of rights to organize The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
<i>For CPRs that are parts of larger systems:</i>	
8.	Nested enterprises Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

¹²⁶ “By ‘successful’, I mean institutions that enable individuals to achieve productive outcomes in situations where temptations to free-ride and shirk are ever present.” (Ostrom 1990, p. 15)

Critiques of Elinor Ostrom's political economy of the commons

Elinor Ostrom's political economy of the commons constitutes an original work inscribed in the perspective of "New Institutional Economics". That label refers to a diverse trend in economics which, following Ronald Coase (1960), renewed the attention given to institutions in economic analysis. Property rights form the core of the institutions analysed by the authors of New Institutional Economics (NIE). Their works approached property through the theory of bundle of rights (which we will discuss in next sub-section) and highlighted its central role in shaping the incentives that encourage individuals to produce and trade efficiently (Weinstein 2013). Until Ostrom, the leading figures of NIE (Ronald Coase, Douglass North, Armen Alchian, Harold Demsetz) insisted on the absolute superiority of strong and well-defined *private* property rights to stimulate wealth creation by founding markets. In this respect, the re-evaluation of common-property regimes in Ostrom's works represents a significant dissidence within a field hitherto at the leading edge of neoliberalism. She showed that economics had neglected the productivity of communities as she revealed the economic importance of activities taking place beyond markets and states. Pierre Dardot and Christian Laval could not be more right when they remark that:

"In a certain way, [Ostrom's] theory of the commons is perfectly contemporary to neoliberalism, which thinks, accompanies and favours the creation of commercial objects and the construction of markets through the development of property rights, forms of contracts, or constructed modes of competition. She enables to elaborate, this time, and in the opposite direction, a theoretical constructivism and she invites at a practical level to the establishment of sets of rules favouring collective action." (2015, p. 151-152)

Her work largely consists in a reflection on the construction of institutions that incentivize cooperation and disincentivize opportunistic behaviours. Important lessons may be drawn from it to avoid the most naïve or unrealistic forms of "spontaneism" that sometimes characterize libertarian thought, so as to grasp the institutional and constructed character of cooperation, sharing, and self-organization.

Elinor Ostrom's use of the term "institution" is not as extensive as the one of Cornelius Castoriadis, who would include within that category such things as languages and idioms, religious or ideological views, social norms and habits. She understands institutions as the set of "working rules" which applies in a particular social context and frames the interactions between individuals. She precises that "all rules contain prescriptions that forbid, permit or require some action or outcome", while working rules are "those actually used, monitored, and enforced when individuals make choices about the actions they will take" (1990, p. 51). Her approach to the relations between working rules (*de facto* rules) and formal laws (*de jure* rules) is particularly interesting:

"Working rules may or may not closely resemble the formal laws that are expressed in legislation, administrative regulations, and court decisions" (1990, p. 51).

It allows her to define the "rule of law" as the idea that in a system, "formal laws and working rules are closely aligned and that enforcers are held accountable to the rules as well as others"

(1990, p. 51). This definition – as well as Ostrom’s work in general – seems essentially descriptive rather than normative; in other terms, she does not say that we ought to aim for the close alignment of working rules and formal laws. And, if it seems sound for a government administration to hold all public officers (and especially those in high position) accountable to the general body of laws (which corresponds to the second part of Ostrom’s definition of the rule of law), it might be desirable to leave a certain autonomy to local communities developing working rules beyond the reach of formal laws (which corresponds to the first part of Ostrom’s definition). Ostrom’s distinction between working rules and formal laws is meant to highlight the fact that the state is not omnipotent and omniscient, that it sometimes lacks power and knowledge to effectively control from above some complex social systems. It is also meant to focus the analysis on the *de facto* rules, since they are the ones which actually shape incentives and generate consequences in the field. This distinction also highlights the fact that communities do not simply produce wealth and manage resources beyond the state and the market, but that they produce collective rules as well. Ostrom argues in favour of the recognition by governmental authorities of the rights of local communities to self-organize and produce rules to manage their resources in certain cases; so as to give a formal (*de jure*) recognition to (*de facto*) working rules that have been produced independently from the state. The idea that communities can produce collective rules independently from the state has been furthered and radicalized by Dardot and Laval (2015). Building on the work of Proudhon (1865), these theorists argue that such rules should be understood as a form of law.

Among all theories of the common(s), Elinor Ostrom’s is the least critique of the neoliberal anthropology. Her analytical frame adopts an *amended* version of rational choice theory, “a very broad conception of rational action, rather than a narrowly defined conception” (1990, p. 37). She adheres to methodological individualism as she starts from the individual to explain institutional change. Individual action takes place in a particular setting composed of the existing institutions and the complex features of the local environment. The rational calculation of individual strategies is limited by the imperfect knowledge of individuals evolving in complex and uncertain situations: for instance, it is not always clear how much water can be sustainably extracted from a particular basin.

Four variables are thus understood to affect an individual’s choice of strategy: expected benefits, expected costs, discount rates, internal norms. The notion of discount rates points to the fact that “individuals tend to discount future benefits” though “how severely depends on several factors” (1990, p. 34). Whether or not individuals expect that they or their children will be present to reap future benefits for instance, significantly affects their discount rates. Internal norms regard the fact that “individuals vary in regard to the importance they place on acting in ways that they and others view as right and proper” (1990, p. 35). Cultural norms and their internalization by individuals thus shape their preferences and affect their strategical choices. In a community in which strong cultural norms against opportunistic behaviours have been internalized by most individuals, it will be less costly to monitor and enforce collective rules. While norms are internalized by individuals and affect their intrinsic motivations (e.g., encourage them to act altruistically because it feels right), working rules are institutions that are external to individuals and shape the incentives (or extrinsic motivations) they face as they calculate and act rationally (e.g., encouraging them to act altruistically to avoid a sanction or

reach a reward)¹²⁷. Shared norms that reduce the cost of monitoring and sanctioning represent a “social capital” that helps a community to manage a CPR. Thus, while Ostrom’s anthropology largely consists in a revised version of rational choice theory, her social ontology is limited to the recognition of the importance of social capital defined as “the aggregate value of social networks (i.e., who people know), and the inclinations that arise from these networks for people to do things for each other (i.e., the norms of reciprocity)” (Hess et Ostrom 2007b).

This analytical framework “reproduces the vision of individual calculators who make the institutional choice of the common in order to obtain strictly private advantages”¹²⁸ (Dardot et Laval 2015, p. 157). On the contrary, when a community opts for the collective management of a resource, this choice cannot be reduced to the aggregation of individual decisions taken separately since it actually results from a properly social process – that Castoriadis’ social ontology describes in more adequate terms¹²⁹. Ostrom’s framework also has limits that are similar to those we have already identified concerning constructivist sociology of technology: the focus on micro-social arrangements that are directly observable obscures the wider social structures and historical trends. Such macro-social structures and their alienating features were respectively grasped through the concepts of “cultural horizon” and “social hegemony” in Feenberg’s terminology, and through the concepts of “social institution” and “heteronomy” in Castoriadis’s¹³⁰. However, in the works of Elinor Ostrom: “The role of economic and social structures in which the commons are developed is never addressed: it is limited to an atomistic representation of society based on a multitude of individuals situated in principle on an equal footing” (Giuliani et Vercellone 2019). The ignorance of social structures seems responsible for Ostrom’s illusion that commons can safely cohabit with the market and the state, that their preservation only requires that decision-makers get provided with evidence that they represent the most efficient institutional arrangement in certain situations. The dynamics of capital accumulation is completely absent from her analysis, in spite of the constant expansion of the market sphere it implies and the pressure it thus puts on the commons (through enclosures or indirect exploitation¹³¹).

¹²⁷ This remark exceeds the concerns and analytical framework of Elinor Ostrom, but we may note that there are sometimes circulations between intrinsic and extrinsic motivations, internal subjectivity and external incentives. For instance, we have seen that neoliberalism develops an institutional environment composed of a sophisticated set of rewards and sanctions (extrinsic motivations), that ultimately aims to transform subjectivities by encouraging individuals to act and think like rational enterprises in competition with others.

¹²⁸ Even an altruistic behaviour appears as the result of the maximization of an individual’s own utility in this framework.

¹²⁹ This does not mean that rational choice theory is illegitimate in social sciences. It is true that it enables to modelize some collective action problems in interesting and sometimes useful ways. Nonetheless, it remains a simplification and approximation of real social processes which has significant limits and blind spots. More importantly, it conveys a vision of human behaviour which is both false and problematic by its normativity and performativity. In other terms, it is an impoverished description of social reality which risks shaping society and humans to its image.

¹³⁰ Castoriadis did not speak of “structure” in order to avoid any confusion between his approach and structuralism, which he accused of being unable to account for the historical change and creation that constantly alters social institutions. Still, for him the instituted weighs on the instituting and it cannot be fully analysed through direct empirical observation at a micro-scale.

¹³¹ As in the case of Wikipedia and Linux whose unpaid contributors produce a commons that is then instrumentalized by capitalist firms to serve their profit.

The fact that Elinor Ostrom's analysis ignores "real relationships of power, ownership and exploitation, which are tangled around the organization of productive relationships" (Giuliani et Vercellone 2019) has serious implications. First, it leads her to define commons in a way that is perfectly compatible with the existence of a social hierarchy and profound inequalities between commoners: often gender inequalities in the case of traditional commons, as well as many other types of power asymmetry in other settings (we saw earlier that an appropriator could be a private firm as well as an individual for instance). This point shows that Ostrom's use of the notions of "self-organisation" or "self-governance" is very far from the ideals of self-management that were promoted by 1960's radicals. Second, it renders her unable to clearly distinguish the logic of the commons from the one of capital. She insists that most institutional arrangements are hybrids, that there is a whole gradation between different forms of property regimes and values this institutional diversity. The problem is that this insistence on the ubiquity of mixed systems and the indifference to exploitation leads her to blur the boundaries between institutional forms, to the point that she understands the capitalist enterprise as a sort of commons¹³²:

"The modern corporation is frequently thought of as the epitome of private property. While buying and selling shares of corporate stock is a clear example of the rights of alienation at work, relationships within a firm are far from being 'individual' ownership rights. Since the income that will be shared among stockholders, management, and employees is itself a common pool to be shared, all of the incentives leading to free riding (shirking) and overuse (padding the budget) are found within the structure of a modern corporation." (Ostrom et Hess 2010)

A last and fundamental critique formulated against Elinor Ostrom's political economy of the commons (Dardot et Laval 2015a; Giuliani et Vercellone 2019) is that it does not fully escape the problems inherited from the Samuelsonian representation of economics based on the intrinsic characteristic of goods. The intrinsic characteristics of goods would "naturally" call for a certain form of production and management: private goods should be produced by private firms competing on the market, while public goods call for production by nonmarket actors (especially the State). Needless to say, this typology considers the private as the rule and the public as the exception. Elinor Ostrom does not consider that common-pool resources naturally call for a private, public, or common-property regime; this is, to a great extent, a matter of collective action and institutional choice. However, her reliance on a naturalistic typology of economic goods seems to render her unable to think that common-property regimes may be extended to resources that do not have the characteristics of common-pool resources. She thus limits the scope of possible commons to two kind of resources: natural resources that are difficultly excludable and rivalrous, and information commons that are difficultly excludable and non-rivalrous. The latter should normally fall in the category of public goods, but the recent threats of privatisation brought them closer to CPRs¹³³.

¹³² This assimilation of private firms to commons comes back at different occasions in Ostrom's work, as this quote also shows: "A modern, private corporation is, after all, a common-property regime that has widespread use throughout the global economy—with both efficient and inefficient consequences." (Hess et Ostrom 2003)

¹³³ "Most of the 'commons' characteristics of knowledge and information have developed from the effects of new technologies—that is, the physical nature of the resource. Before the digital era, types of knowledge

Other authors, more sympathetic towards Elinor Ostrom, have argued that this critique is based on a misinterpretation of her work (Broca et Coriat 2015). It is true that Ostrom is not perfectly clear on this point, that some of her formulations are rather confusing¹³⁴. I tend to think that this results from a will to extend her analytical framework beyond its initial purpose: her whole theory of the commons was tied to a naturalistic typology of economic goods, and she tried to escape from its problematic implications in her latest works on information commons. In my view, Ostrom finds it conceivable to apply common-property regimes to some public goods, but the critique expressed against her remains valid in so far as she would never extend those to pure private goods:

“The advantage of individual ownership of strictly private goods - where the cost of exclusion is relatively low and one person’s consumption is subtractive from what is available to others - is so well established that it does not merit attention here” (Ostrom et Hess 2010).

Thus, in Ostrom’s political economy, strictly private goods call for individual ownership and production by market actors. If we also consider her indifference to the issue of exploitation and profit-oriented production, it is clear that her theory legitimates the production of private goods by capitalist enterprises.

The issue of Elinor Ostrom’s naturalistic bias is linked to debates (A) and (B), which respectively regard techno-determinism and technocracy. Indeed, it concerns the way the physical attributes (whether natural or man-made) of a resource and the available technologies (e.g., switching from axes to chainsaw in the exploitation of a forest CPR), generate *affordances* that “can make some actions, relationships, organizations, and institutions easier to pursue, and others harder” (Benkler 2006, p. 17). Ostrom’s work aims to identify the most efficient institutional arrangements for the governance of resources, in function of their intrinsic characteristics and the technologies available. This is not an illegitimate endeavour, but we must keep in mind that the choice between private and common-property for instance, cannot simply be left to an expert on the basis of a supposedly neutral definition of “efficiency”¹³⁵. Indeed, such a choice engages considerable value-judgements and should thus be a matter of democratic decision-making: should we encourage cooperative or competitive behaviour? Is it “efficient” to produce more if it implies to share less? etc. The expert has a role, he may highlight the

commons were limited to libraries and archives. Only when vast amounts of knowledge began to be digitally distributed (after the development of the World Wide Web in 1992) did it take on more and more characteristics of commons and commons dilemmas” (Hess et Ostrom 2007a, p. 46).

¹³⁴ This paragraph for instance, seems to leave some room for interpretation:

“Commons analysts have often found it necessary to differentiate between a commons as a resource or resource system and a commons as a property-rights regime. Shared resource systems—called common-pool resources—are types of economic goods, independent of particular property rights. Common property on the other hand is a legal regime—a jointly owned legal set of rights. Throughout this book, the more general term commons is preferred in order to describe the complexity and variability of knowledge and information as resources. Knowledge commons can consist of multiple types of goods and regimes and still have many characteristics of a commons” (Hess et Ostrom 2007b).

¹³⁵ In *Governing the Commons*, Ostrom seems to define efficient CPR institutions solely as those that may sustain the CPR over time. This definition seems rather legitimate in my opinion, but it is one among other possible definitions and this choice implies a value-judgement. As we have seen (see Chapter 1, “Impure Reason”), when the abstract principle of efficiency is contextualized in the social world, it necessarily takes on particular values.

positive and negative implications of different institutions so as to feed and enrich public deliberation, but the decision is not his to make. Furthermore, Ostrom largely overestimates the constraints (or affordances) that the intrinsic characteristics of goods put on institutional choice. As Giuliani and Vercellone remark (2019), health services and education are theoretically rivalrous and excludable through pricing, which defines them as “private goods”, but they are most often delivered by the state or non-profit organizations. Even pure public goods such as defence, justice and security may be produced by capitalist enterprises. No good is necessarily destined, due to its intrinsic qualities, to become the object of a particular method of management.

We may thus conclude with Pierre Dardot and Christian Laval that:

“If there is one historical reality which would be wise for economists to consider, it is that the enclosure movement did not result from the sudden realisation by landowners of the ‘nature’ of land as an exclusive and rivalrous good, but from the transformation of social relations in the English countryside.” (2015, p. 157)

Property as a bundle of rights and the commons as common-property

One of the main conceptual questions that theories of the commons have had to face since their emergence in the 1990's, concerns the relation between commons and property: should we conceive and institute the commons within or against property, as common-property or as non-property? Earlier, socialist thinkers and the workers movement also had to confront with that thorny subject. Overall, the definition of socialism as the collective property over the means of production prevailed in the history of the workers movement. It was in line with the conceptualisation developed by Marx in most of his works¹³⁶ but contradicted the views of Proudhon who attempted to envision an economy beyond property¹³⁷ (Borrits 2018). As we have seen, following the enclosure movement, the modern notion of property was founded as the absolute and exclusive right of an individual (a physical or moral person) over a thing, thereby reviving and radicalizing the Roman concept of property (*dominium*). This understanding of property clearly remains in countries of Romano-Germanic juridical tradition. In France for example, property is defined in the article 544 of the Civil Code as: “the right to enjoy and have things in the most absolute of ways, as long as one does not make any use of it that is forbidden by laws and regulations”¹³⁸ (Code civil - Légifrance 1804). A similar conception of property also characterized countries of Common Law for a couple of centuries¹³⁹, until a different and original understanding of the concept started to emerge in the early 20th century United States: the theory of property as a bundle of rights. It is based on this conception of property that different theorists have approached the commons as common-property (Broca et Coriat 2015; Lessig 2003; Orsi 2013; Schlager et Ostrom 1992).

Rather than understanding property as the absolute right of a person over a thing, this theory approaches property as a bundle comprising various rights (e.g., use, exclusion, alienation) that may be distributed between different physical or moral persons (including public administrations, private firms, and communities). On the one hand, property does not appear as a monolithic bloc in this approach, since it constitutes a bundle of rights that may be distributed in various ways between individuals and collective entities. On the other hand, it does not appear as the right of a person over a thing, but as a complex set of social relations between people regarding things. Different lists have been proposed to subdivide property in multiple rights as precisely as possible: they range from a simple subdivision into “*usus*”/“*fructus*”/“*abusus*” to a list of 11 specific rights (Honoré 1961). The conception of property as a bundle of rights is a flexible analytical framework rather than a political project: the bundle of rights may be distributed and shared between individuals, but it can also remain

¹³⁶ According to Borrits (2018), Marx promoted collective property in the form of state property as a strategical means during most of his life, except during a short phase between 1864 and 1872, in which his positions were more libertarian.

¹³⁷ Proudhon had nothing against the small property of the immediate producer, that is private property based on personal labour. He was opposed to the notion of property regarding collectively organised production. He especially opposed capitalist private property but rejected public-statist property as well, and preferred to approach cooperatives and similar worker-controlled production beyond the notion of property.

¹³⁸ « La propriété est le droit de jouir et disposer des choses de la manière la plus absolue, pourvu qu'on n'en fasse pas un usage prohibé par les lois ou par les règlements ».

https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000006428859/

¹³⁹ William Blackstone's already quoted (see chapter 2, “Enclosures and progress”) definition of property is an eloquent testimony of it.

completely in the hands of a single individual. Thus, it cannot be seen as a program in favour of an equitable distribution of and control over resources and has actually been adopted by very different ideological currents over time.

Fabienne Orsi (2013) presents the intellectual history of the theory of property as a bundle of rights in three phases: it was initially developed by John Commons and the left-leaning juridical current of legal realism, then was adopted by central figures of New Institutional Economics championing private property, until Elinor Ostrom re-conceptualized it in a way that opened a new space to think about common-property. John Commons and – later – legal realism have developed the theory of property as a bundle of rights to oppose the sacralization of private property and free markets and encourage State interventionism in the context of the early 20th century United States. At this time classical liberalism dominated the stage and private property was considered as a natural right that was guaranteed by the constitution and could not be infringed upon. The book of John Commons (1893) that first presented the idea of property as a bundle of rights was so radical that it owed its author numerous accusations of “socialism” and the exclusion from different universities (including Indiana University where Elinor Ostrom later worked). Entitled “*The Distribution of Wealth*”, this book developed one key idea: the distribution of wealth does not result from market forces but from State policies. State policies does not only refer here to explicit State interventionism in the economy, but more generally, to all legal foundations of property and exchange. Following this argument, property is not a natural right that pre-exists positive law but a State creation. The way property rights are defined, distributed and protected would exhaustively determine the distribution of wealth. The whole question of the legitimacy of State infringement on private property becomes absurd: since property does not pre-exists to its creation by the State, the latter cannot infringe upon it from the outside but constantly determines its extension and its form. Legal realists followed in a rather similar (though slightly less radical) vein to undermine the jus-naturalist justification of private property which encouraged its most absolutist and exclusivist version¹⁴⁰, so as to encourage State interventionism and redistribution – slowly setting the stage for the policies of the New Deal.

Since the 1960’s, Ronald Coase and New Institutional Economics (NIE) have adopted the conception of property as a bundle of rights, thus certifying it as non-partisan. Alchian and Demsetz for instance affirmed that: “It is not the resource itself which is owned; it is a bundle, or a portion, of rights to use a resource that is owned” (1973). The adoption of the theory of property as a bundle of rights by NIE turned it into the dominant understanding of property in American law. It illustrates the distance taken by neoliberal thought with the classic liberal ideas of “*laissez-faire*” and natural rights: property rights and markets are now seen as

¹⁴⁰ There are two main forms of justification of private property: natural rights theory (property is a natural right that pre-exists positive law and is good in itself) and utilitarianism (property is legitimate since it encourages wealth creation and benefits society).

To be clear: the debate between the definition of property as an absolute right vs property as a bundle of rights and the debate between jus-naturalist vs utilitarian justifications of property are related but different.

I focus on the first debate.

The theory of property as a bundle of rights has clear affinities with utilitarian justifications of property – it even seems incompatible with jus-naturalism. It is also true that jus-naturalist justifications of property usually lead to define and promote it as the absolute right of an individual over a thing. However, the promotion and definition of private property as an absolute right can also be justified uniquely by utilitarian considerations.

institutional constructions that must be cautiously designed to encourage wealth creation, competition and productivity. The intellectual and political origins of the theory of property as a bundle of rights got largely obscured as a vast portion of economic and legal literature started to associate it with the idea that, for a property system to be efficient, owners should control the whole bundle of rights and remain free from external interference. In other terms, the sacralization of private property came back within this new analytical framework. Alchian and Demsetz criticized common-property as inefficient, destructive and immoral after defining it as the absence of the right to exclude. This definition repeated Hardin’s mistake. Indeed, Ostrom has shown that communities who collectively own resources can develop clear rules regarding their use and exclude unauthorized users.

Elinor Ostrom adopted the conception of property as a bundle of rights in an article written with Edella Schlager (1992). They defined “rights” as actions authorized by rules and “property rights” as “the authority to undertake particular actions related to a specific domain”. Ostrom and Schlager identified five different property rights that they deemed relevant in the analysis of CPRs:

- 1) Access: The right to enter a defined physical property
- 2) Withdrawal: The right to obtain the “products” of a resource (e.g., catch fish, or appropriate water)
- 3) Management: The right to regulate internal use patterns and transform the resource by making improvements.
- 4) Exclusion: The right to determine who will have an access right and how that right may be transferred.
- 5) Alienation: The right to sell or lease either or both management and exclusion rights.

These rights may be *de jure* if they are recognized by formal political institutions or simply *de facto* if they are not. The authors make a clear-cut distinction between the first two rights (access and withdrawal) conceived as operational level rights and the last three rights (management, exclusion, alienation) conceived as collective-choice rights. This distinction is crucial as it represents “the difference between exercising a right and participating in the definition of future rights to be exercised” (Schlager et Ostrom 1992). The five rights are cumulative and define four classes of property rights holders: authorized user, claimant, proprietor, owner.

TABLE 1
BUNDLES OF RIGHTS ASSOCIATED WITH POSITIONS

	Owner	Proprietor	Claimant	Authorized User
Access and Withdrawal	X	X	X	X
Management	X	X	X	
Exclusion	X	X		
Alienation	X			

*Extracted from
Schlager et Ostrom
(1992).*

The adoption of the conception of property as a bundle of rights allows Elinor Ostrom to develop a sophisticated analysis of the legal aspects of the various property regimes (private, public, common) and mixtures of them that she discusses. On this base, she has refuted Hardin as well as Alchian and Demsetz by affirming that:

“Groups of individuals are considered to share communal property rights when they have formed an organization that exercises at least the collective-choice rights of management and exclusion in relationship to some defined resource system and the resource units produced by that system” (Ostrom et Hess 2010).

There are thus only two forms of common-property regimes in her view: common proprietorship – when the community has the first four property rights but lack the right of alienation – and common ownership – when the community holds all five property rights. She also insists that the absence of the right of alienation does not make the property regime incomplete or insufficient. On the contrary, she demonstrates that: “proprietors face incentives that are frequently substantial enough to encourage similar long-term investments” (Schlager et Ostrom 1992).

Digital commons can also be understood as a form of common property (Broca 2016; Xifaras 2010). Indeed, the General Public Licence as well as the Creative Commons Licences are nothing but licences which an author may add to its copyright in order to authorize certain uses of his work. Legally, digital commons thus function through and are protected by copyright law. Rather than accepting all use restrictions that are established *a priori* and as a monolithic bloc by copyright law, these licences enable authors to choose precisely what rights they are willing to grant to the public. They can subdivide the bundle between the rights they keep for themselves (e.g., the right of attribution to make sure no one else falsely claims to be the author) and those they grant to the public (e.g., the right to distribute or to modify the work). It is because the author is recognized as the owner of his creations that he can freely choose to share a part of the bundle of rights with the public. When a licence allows the free distribution of a work and thus establishes a regime of open access to it, it neutralizes both the right of alienation and the right of exclusion. Indeed, the work becomes accessible to all and exclusive to no one. The neutralization of the right of exclusion also suppresses the right of alienation since the latter concerns the transfer of the former. There is no point in selling or leasing a work that is already open to all; thus, the work itself cannot be commodified, though commercial activities may be developed around it. While Ostrom considered common-property regimes required “at least” the existence of collective exclusion rights, this approach to digital commons goes further since it “makes it possible to see an entirely serious conceptual dissociation between property and exclusivity” (Xifaras 2010). The open access regime established by the GPL for instance exists within a property relation: the creator and owner keep certain rights (such as attribution) and non-owners must respect some legal obligations (to keep copies and derivative works under the same licence). In this approach, the property system seems extremely flexible and all-encompassing. However, some categories of objects would still be seen as beyond the sphere of property: *res nullius* (“things without master”) and *res communes* (“common things”).

These two categories should not be confused: “while common things cannot be appropriated, things without a master are simply not appropriated yet, and therefore, can be appropriated by anyone” (Chardeaux 2004 quoted in Dardot et Laval 2015, p. 33). If *res communes* cannot be appropriated, this is not because of any moral or juridical imperative, but rather because no one has the capacity to appropriate them. In Roman law, *res communes* included the air, the sea and seashores. The notion of *res communes* remains present in the French civil code which defines them as: “things that belong to no one and the use of which is common to all” (Article 714 - Code civil - Légifrance 1803). Since these things are understood as naturally outside the sphere of property, their non-appropriability is not really instituted by law and the category of *res communis* is not fully juridical. *Res communes* are rather regarded as a pre-judicial enclave, a remain of the primitive age of humanity in which all things were allegedly common to all men. The inappropriability of *res communes* is thus based on very fragile grounds: if new technologies render feasible their private appropriation, there are no juridical recourse against it (Dardot et Laval 2015). It is also to avoid any confusion with the notion of *res communes* that I have indicated earlier¹⁴¹ my preference for the notion of “commons” over the expression “common goods”. *Res nullius* on their side refer to “things without master” that may be appropriated by anyone who wants them: fishes in the sea for instance. The unregulated open access regime imagined by Hardin (which radically differs from the protected open access regime instituted by the GPL) corresponds to the category of *res nullius*: there is no restriction on the appropriation and use of these resources. In the field of information commons, works that are in the public domain are generally considered as *res communes*¹⁴². As we have seen¹⁴³, in the 1980’s, when universities used to put in the public domain the software code they developed, enterprises were able to integrate it within slightly modified proprietary software. The public domain represented a rather fragile protection against enclosure since it could not keep derivative works from becoming proprietary. It is this shortcoming which has motivated Richard Stallman to develop the GPL.

¹⁴¹ See Chapter 2, « Commons »

¹⁴² This is the case in French law at least. The reference to *res communes* does not seem as clear in the context of American law.

¹⁴³ See Chapter 2, « A Brief History of Free and Open Source Software”

Against property

The theory of property as a bundle of rights thus provides a sophisticated analytical framework allowing some theorists (essentially Elinor Ostrom and thinkers inspired by her) to conceive the commons as common-property regimes. This approach is not devoid of interest but my support goes to a radically different one that was mostly developed by Dardot and Laval (2015) in the field of political theory and Benoît Borrirts (2018) in the field of political economy. The latter opposes the political principle of the common and the particular commons in which it gets realized to property as such. It claims that commons should be instituted outside and against the sphere of property. This does not mean that they would not be protected or weakly so, by rejecting them in the categories of *res nullius* or *res communes*. As we shall see later¹⁴⁴, Dardot and Laval consider that commons should be instituted as a whole category of things (inspired by the Roman notion of “*res nullius in bonis*” or “things among the property of no person”) juridically devoted to public use and beyond the sphere of property. Thus, their inappropriability would be solidly grounded in law. The fact that currently existing legal systems give so much strength to property rights that commons activists have had no choice but to hack property (e.g., the invention of the GPL) in order to make room for the commons, does not mean that this represents the best conceivable option in the long-term¹⁴⁵. The understanding of the common as a political principle frontally opposed to property will be extensively discussed in this chapter’s last section. However, at this stage, it seems necessary to expose a few shortcomings of the conception of property as a bundle of rights and the approach of the commons as common-property, which call for a different perspective on the commons.

A major issue with the conception of property as a bundle of rights is that it has only developed in the countries of Common Law. It is not the conception of property formulated by European laws and practiced by European jurists, and it is unclear how complex it would be to import it and re-found our legal systems accordingly. More importantly, it is clearly not the understanding of property that dominates the social imaginary of western – or even global – civilisation. In the eyes of the general public in the west, and probably worldwide, the idea of property is extremely difficult to dissociate from the figure of the master holding an absolute right over a thing which comprises the *usus*, *fructus*, and *abusus*. In the American context, Lawrence Lessig has often deplored this fact:

“We are lawyers. [...] We know that property is a bundle of rights. [...]

But what we lawyers forget is that ordinary people think about ‘property’ differently. [...] They have a much simpler conception of property. ‘Property’, ordinary people think, is ‘absolute and mine forever’. If you say to ordinary people, ‘What do you think of the idea of fair use of your property, or only having your property for limited times?’, they are likely to think, ‘Well, that’s weird. You don’t have a fair use right to my car, nor

¹⁴⁴ See at the end of this chapter, sub-section “Instituting praxis, the law of the common and the state”.

¹⁴⁵ “If non-ownership ideally defines the common, the latter is still immersed in a universe dominated by capital. In this context, one of the key functions of the law of the common, including ‘hijacking’ public and private instruments, will be in the future to continue protecting its development, which is threatened by the combination of neoliberal politics and the extractive purpose of cognitive capitalism.” (Giuliani et Vercellone 2019)

are you able to say after a limited time the state can come in and take away my house'."
(Lessig 2003)

Theorists of the commons as common-property have sometimes – rightly – argued that this is not a fatality and that the public's perspective on property can change (Broca 2016). No doubt that this is a possibility but, how much effort is required to transform such a deeply rooted idea and for what result? The breadth of efforts required is uneasy to measure but they clearly seem considerable. On the other hand, the foreseeable results do not seem encouraging for any person critique of capitalism or simply of wealth inequalities. The theory of property as a bundle of rights, as we saw, is a politically neutral analytical framework. By itself, in no way does it imply more sharing and equality. It has become the dominant conception of property in American law since the 1970's and – to say the least – we have not observed a trend towards a more equal distribution of resources in the US since then. It may open a space to think and promote common-property, government regulations, the protection of consumers and worker's rights by distributing property rights, highlighting their limits and the duties associated to them, but this is far from being a necessity.

Overall, the progressive success of the theory of bundle of rights in countries of Common Law has accompanied the transformations of capitalism in the 20th century: "the dematerialisation of what is possessed – the intangibles – begets a very flexible theory of property, typical of the practice of Common Law and particularly suited to the enlargement of the category of property to new forms of capitalism as well as to the integration of the 'externalities' that preoccupy economists" (Dardot et Laval 2015, p. 474). The concept of property inherited from Roman law was centred on physical resources, especially land, whereas the main objects of property have now become intangible: corporate shares, trademarks, patents, obligations etc. It is less suited to an economy of services and products sold as services (leasing and subscription rather than property of physical products).

Furthermore, Dardot and Laval (2015, p. 476-480) have argued that the independence and parcelling of property pose a serious problem: we cannot expect different and unequal rights (and their holders) over a same thing to coexist peacefully in today's society. It would be misleading to think in analogy with the property relations that characterized feudal society, when collective rights over privately-owned resources could endure because of the existence of a dense network of relations of dependency regulated by local customs. The right of alienation (that is the right to sell but also to misuse and destroy the resource) for instance, weighs incomparably more than the right to use a resource.

"It is in virtue of this right that an owner, be it a private owner or the State itself, can brutally call into question an ancient use right, without any consideration for its established character" (Dardot et Laval 2015, p. 476).

The mass movement of land enclosures that occurred in the global south (and especially in sub-Saharan Africa) in the last decades was possible because the governments owning these lands could disregard the ancient use rights of local communities occupying them. For this reason, Dardot and Laval consider that use rights over a resource must be inextricably tied to its collective and democratic administration.

Approaching the commons as common-property also risks to lead to the same problems that the workers movement has faced by defining socialism as the collective property over the means of production. Benoît Borrits (2018) has remarkably described the problems associated to the notion of collective property and argued it has been responsible for some of the worst disasters of the 20th century. His contention is that the notion of property necessarily comes with those of *exclusion* – “property excludes from the field of use, benefit and decision-making he who is not owner” – and *planification* – “by definition, the owner commands what the production unit will execute” (Borrits 2018, p. 16). Property is exclusive or privative by essence. Etymologically, the term comes from the Latin “*proprietas*” which derives from “*privatus*”, meaning “particular”, “own”, or “individual” (Dardot 2018). Property does not have to be private to be privative/exclusive: collective property (e.g., state property, workers cooperative, natural commons) is always exclusive to the members of the collective and excludes those who do not belong to that collective. Elinor Ostrom does not say otherwise: for her, it is precisely the existence of collective exclusion rights which define common-property regimes. It is also for this reason (exclusiveness) that Yochai Benkler considers that the common-property regimes presented by Ostrom are not the most adequate examples of commons: “these are better thought of as limited common-property regimes, rather than commons, because they behave like property vis-à-vis the entire world except members of the group who together hold them in common” (Benkler 2006, p. 61). In the history of the workers movement, the exclusive character of collective property led to an unending debate concerning the perimeter of the proprietary community: shall it be limited to the members of a cooperative, to the inhabitants of a city or region, the citizens of a nation-state, or shall it include mankind as whole? The only way to surpass the exclusiveness of collective property was to make mankind the owner.

Property also implies planification. The owner remains a master holding an absolute right over a thing, a single will commanding from above. As the scale of property gets larger, the coordination of specialized labours gets more complex and the dissociation between those in command and those who execute intensifies. The notion of property thus encourages bureaucratisation through the dissociation between command (located in the hands of owners) and execution (to which workers are reduced). As he analysed the 20th century experiences of state property, Borrits was led to conclude that: “by becoming the owner of the means of production, the State, and thus the social class that controls it, always behave as an owner by monopolising the function of decision” (2018, p. 128). Even when attempts have been made to associate workers or consumers to the management of companies that are legally state-owned (as in the case of Tito’s Yugoslavia), “the State always remain the owner and decision-maker in the final analysis” (2018, p. 128). Since the notion of property systematically revives the figure of the absolute master whose right extends from the *usus* to the *abusus*, Pierre Dardot asserts that “the sole reference to the ‘general interest’ is incapable of establishing the difference, *a fortiori* the opposition, between public property and private property for the vagueness of the notion easily allows to slip in every trap of the proprietary logic”¹⁴⁶ (Dardot

¹⁴⁶ It is probably exaggerated to completely deny the difference between public and private property. Still, this difference is systematically overestimated and mystified, and has even represented the central political cleavage

2018). Indeed, it is the absoluteness of property that enabled States to privatise during the last decades quantity of resources they formally owned on behalf of their national community. Finally, Dardot and Laval are led to consider, after Proudhon, that the ancient analogy between the absolute right associated with property (*dominium*) and the absolute right associated with sovereignty (*imperium*), still remains effective in spite of the limits put on the latter by liberal democracy.

Understanding property in those terms (rather than dismembering and complexifying it through the notion of bundle of rights) has the advantage of identifying the problem which must be overcome; and thus, to point to the opposite direction as the space where an alternative ought to be sought.

Now that we have discussed and criticized the political economy of Elinor Ostrom and its associated juridical perspective on the commons as common-property, we will focus in the next sub-section on another major liberal theorist of the commons, Yochai Benkler.

in the world during the Cold War. In that respect, the insistence on their commonalities is important and laudable in my view.

Yochai Benkler and commons-based peer production

In his most important work “*The Wealth of Networks*” (2006), Yochai Benkler focuses his analysis on the way information, knowledge and culture are produced and exchanged, and what does this imply for human freedom and justice. His main claim is that a new stage of the information economy is emerging: the networked information economy is starting to displace the industrial information economy. The latter dominated from about the second half of the 19th century and throughout the 20th century, while the networked information economy started to emerge in the 1990’s.

The core feature of the industrial information economy was that the essential means of information production and communication were large-scale machines requiring ever-larger investment in fixed capital: “large scale-mechanical presses, the telegraph system, powerful radio and later television transmitters, cable and satellite, and the mainframe computer became necessary to make information and communicate it on scales that went beyond the very local” (Benkler 2006, p. 3-4). The radical change associated with the new technological environment is that: “the declining price of computation, communication, and storage have, as a practical matter, placed the material means of information and cultural production in the hands of a significant fraction of the world’s population – on the order of a billion people around the globe” (Benkler 2006, p. 3). The paradigmatic means of information production and communication (personal computers and internet access) in the networked information age have become relatively cheap and widely distributed, whereas they were extremely costly and concentrated in the industrial age. The industrial information economy was thus dominated by mass media (print, radio, television) that were “either under state ownership, with various degrees of independence from the sitting government, or under private ownership financially dependent on advertising markets” (Benkler 2006, p. 176). On the contrary, the networked information economy is characterized by the increasing role of non-proprietary, non-market, and decentralized information production achieved either by individuals alone or by cooperative efforts in loosely woven collaborations (that is, by peer production).

Yochai Benkler first remarks that non-proprietary and non-market production has always been more important in the information economy than in the rest of the industrial economy: “There are no non-commercial automobile manufacturers. There are no volunteer steel foundries. [...] Nevertheless, scientists working at non-commercial research institutes funded by non-profit educational institutions and government grants produce most of our basic science” (2006, p. 35). Part of the reason for this is that arts, science, political and religious debate have always been infused by more non-market motivations than the production of material commodities such as washing machines or refrigerators. The main explanation, however, is that information is a public good (non-rivalrous and non-exclusive) and will thus not be produced by the market if priced at its marginal cost (that is, zero). To provide artists or scientists with an income, publishing has been regulated through different exclusive rights (e.g., copyright, patents). These grant a temporary monopoly privilege over a work, enabling publishers to price them above their marginal cost and redistribute part of the revenue to the artist or scientist. However, the resulting market is considered inefficient by definition:

“Because welfare economics defines a market as producing a good efficiently only when it is pricing the good at its marginal cost, a good like information (and culture and knowledge are, for purposes of economics, forms of information), which can never be sold both at a positive (greater than zero) price and at its marginal cost, is fundamentally a good candidate for nonmarket production.” (2006, p. 36)

Markets based on copyrights and patents thus involve a trade-off between dynamic and static efficiency: on any given day, it is considered inefficient to limit the circulation of information through exclusive rights, but over time, exclusive rights (according to their promoters) incentivize information production. Another characteristic of information is that it is both the input and output of its own creation process: scientists for instance, need to access the products of prior research to contribute to progress in their respective field. Consequently, the dynamic effect of exclusive rights over information is ambiguous: they raise the expected returns from information production, but also raise the costs of information inputs. Further, the expected returns are only raised for producers adopting a market-based and proprietary strategy, while the input costs increase for every information producer. On this base, Yochai Benkler develops a solid critique of the trend towards stronger intellectual property rights, which would “increase the attractiveness of exclusive-rights based strategies at the expense of nonproprietary strategies, whether market or non-market based” and encourage market concentration by favouring large firms able to develop a large inventory of patents and copyrights (2006, p. 50). The insistence on the particular characteristics of information also allows him to explain why its production and exchange generally leaves more room for non-proprietary and non-market strategies than is the case for material production.

The networked information environment increases the role of non-market production in general and makes possible a new model of information production, *commons-based peer production*, which is non-market, non-proprietary, and radically decentralized. Yochai Benkler defines the commons as a particular institutional form of structuring the rights to access, use, and control resources, which is opposed to property. The central characteristic of property as the institutional foundation of markets is that “the allocation of power to decide how a resource will be used is systematically and drastically asymmetric” (2006, p. 61). This asymmetry points to an owner which controls the resource and uses it as he pleases, within certain limits specified by law. Conversely, the core characteristic of the commons is that “no single person has exclusive control over the use and disposition of any particular resource in the commons” (2006, p. 61). This definition leads Benkler to include within the category of commons, not only information commons, but also, the oceans, the air, highway systems, streets and with a certain reservation¹⁴⁷, the natural commons studied by Ostrom. Thus, regardless of whether the juridical regime of a resource is public property (e.g., highway systems, streets), common-property (e.g., common pastures), *res communes* (e.g., oceans, air) or something else, Benkler would consider it a commons if and to the extent that no single person has exclusive control over its use and disposition. Saying that a form of production is “commons-based” means that

¹⁴⁷ As we have seen, he says that “these are better thought of as limited common-property regimes, rather than commons, because they behave like property vis-à-vis the entire world except members of the group who together held them in common” (2006, p. 61). Still, Benkler’s previous sentences in the same paragraph suggest that they represent a certain type of limited commons.

it is not built around the asymmetric exclusion which defines property but shares its inputs and outputs, “freely or conditionally, in an institutional form that leaves them equally available for all to use as they choose at their individual discretion” (2006, p. 62). Commons-based production can be undertaken by individuals, hierarchically organized non-profit organizations (including public research institutions), market-based enterprises that adopt a non-proprietary strategy (e.g., IBM supporting Linux), or cooperatively via peer production. Commons-based production is thus non-proprietary by definition and it is generally not market-oriented unless it is undertaken by a corporation like IBM, that aims to reduce its R&D costs or develop services around the commons. As we saw earlier¹⁴⁸, peer production is organized in a radically decentralized way, between widely dispersed individuals, without relying on a managerial hierarchy. Individuals choose whether and how to contribute to a project, rather than executing hierarchically assigned tasks.

In Benkler’s view, humans have diverse and incommensurable motivations: some are money-oriented and others are social or psychological, some are extrinsic and others are intrinsic. Man should not be seen as a *homo economicus*, but rather, as a “*homo socialis*, whose motivations are diverse and socialized and whose decisions are situational and reasonable, not formally rational” (Benkler 2019b). Human motivations cannot be reduced to one single measure: utility. This assumption has led numerous economists to consider that utilities can be translated in a universal medium such as money. Consequently, rewarding any activity with money would always make it more desirable to rational individuals. On the contrary, monetary compensations may reduce psychological and social gains associated to multiple activities by altering their meaning: a conversation with a friend, a night with a lover, a verdict decision etc. Human motivations are neither fungible nor always cumulative: extrinsic motivations (such as money) may crowd-out intrinsic ones. People who contribute to CBPP projects do not generally do so because their manager told them to, nor because they expect a monetary return. CBPP is a new form of social production and exchange. According to Benkler, the social production of goods and services is ubiquitous though unnoticed:

“*It is, to be fanciful, the dark matter of our production universe*” (2006, p. 117).

Social production is governed by the logic of the gift rather than market rationality: “the mark of the gift between close friends and relatives... is not the absence of obligations, it is the absence of ‘calculation’” (Godelier 1999, quoted in Benkler 2006 p. 109). Contrarily to the crisp, formal and contractual obligations associated with hierarchical firms and markets, the norms of reciprocity regulating social exchange are informal, symbolic and subject to interpretation. Asking a stranger for directions in the street, cooking a diner for someone, helping a friend moving, babysitting a nephew etc. These are all pervasive forms of social production and exchange. They do not only relate to public goods, but also to private ones (e.g., a meal). They are not always confined to close communities (e.g., a stranger may give you directions). They may complement or substitute market and state production. Economists mostly ignored social production because its efficacy has remained rather limited: it appeared to them as social reproduction rather than production, properly.

¹⁴⁸ Chapter 2, “Practices and Values of Free and Open Source Software”

Yochai Benkler contends that the networked information economy is now radically increasing the importance of social production. The main reason for that is the fact that the means of information production are increasingly distributed: “when use of larger-scale physical capital goods is a threshold requirement of effective action, we should not expect to see widespread reliance on decentralized sharing as a standard modality of production” (2006, p. 119). Social exchange may be present in some large-scale capital projects such as worker-owned firms and the Spanish irrigation commons discussed by Ostrom; but these are mixed systems replicating some characteristics of firms and markets. The second reason is that the raw material for information production is information itself, which can be universally shared because of its public good characteristics. The third is the development of new organisational models on the internet, whose high modularity allows to integrate a multiplicity of modest individual contributions. Considering that the production of information, culture, knowledge and the manipulation of symbols have now become the main economic sectors, Benkler asserts that CBPP and social production “will emerge, if permitted, at the core rather than the periphery of the most advanced economies” (2006, p. 3).

Yochai Benkler seldom uses the expression “mode of production” (only twice, page 6 and 355) to describe commons-based peer production (CBPP). Indeed, he seems to wilfully avoid this expression most often, for the simple reason that its Marxist accents would suggest that CBPP is meant to replace the capitalist mode of production. On the contrary, Benkler contends that CBPP can and should develop in complementarity with capitalism: “a stable social production system can coexist and develop a mutually reinforcing relationship with market-based organizations that adapt to and adopt, instead of fight, them” (2006, p. 123). Social production only threatens incumbent firms of the industrial information economy, which embody what I have referred to as the first, IP-based business model of cognitive capitalism: Microsoft has to compete with free software, Encyclopaedia Britannica has to compete with Wikipedia, pharmaceutical companies are confronted to generic drugs, and cultural industries are challenged by amateurs and threatened by peer-to-peer file sharing etc. Simultaneously, it may provide business opportunities to more innovative firms choosing to adapt to the networked information economy. They may invest in commons-based peer production to reduce their R&D costs and develop commons-related services, like IBM or Red Hat. Or they may encourage peer production processes on their own platforms, thus adopting the business model of platform capitalism. The affinities between Yochai Benkler’s analysis of the networked information economy and the post-operaist analysis of cognitive capitalism should now be clear. Like Benkler, post-operaists consider that social production is rising at the core of the highest value sectors of the world economy. However, they interpret it as the development of a new mode of production which is meant to replace capitalism. They consider that biopolitical labour is not organized by capital anymore but tends to self-organize spontaneously. Rather than encouraging firms to embrace the business opportunities provided by this new context, they denounce this “mutually reinforcing relationship” as a new and parasitic form of capitalist exploitation. Against this thesis, I have argued that exploitation should not be purely reduced to theft since, overall, capital still organizes the productive cooperation of workers.¹⁴⁹

¹⁴⁹ My arguments against this post-operaist thesis can be summed up as follows:

The rise of social production in the networked information economy should significantly further the practical realisation of core liberal values such as individual autonomy, political freedom, social justice and a critical culture according to Benkler. It should enlarge the range of effective action that individuals can do for and by themselves, individually or cooperatively, and make them less susceptible to manipulation by the owners of communications infrastructure and media. It should democratize the public sphere by allowing citizens to actively participate to public deliberation, rather than passively receive the analysis proposed by the authorized speakers of mass media. The non-proprietary outputs of the networked information economy (that is, information commons) can promote social justice at global scale by giving a free access to software, scientific publications, and some products of agricultural and pharmaceutical research. The networked information economy should also enable the development of a more self-reflective and participatory culture, which is not uniquely shaped by cultural industries (e.g., Hollywood) but by people expressing themselves, creating and communicating on the internet.

The switch from an industrial information economy to a networked information economy, however, is not a historical necessity driven by recent technological developments (internet and personal computers) in the eyes of Yochai Benkler:

“There is no inevitable historical force that drives the technological-economic moment toward an open, diverse, liberal equilibrium.” (2006, p. 379)

Society is not determined by a technological base. Technology only creates affordances, that is “feasibility spaces for social practices” making “some things easier and cheaper, and others harder or more expensive to do” (2006, p. 31). The practical outcomes are ultimately shaped by the interaction between new technological-economic feasibility spaces and the social responses to them, in terms of law and social practices. Many incumbent firms of the industrial information economy are directly threatened by the emergence of the networked information economy. They have quantity of resources to influence the political and legal system to their advantage. Benkler’s book is thus meant to highlight the stakes of a major battle taking place between on one hand, these incumbent firms, and on the other, the widely diffuse populations engaged in commons-based peer production and the firms providing the devices and platforms that support their networked communications. The institutional question to settle is whether the resources necessary for information production and exchange will be governed as commons, free for all to use, or as property, available only to market actors and well-funded non-market ones (governments and organized philanthropy). In regard to communication media, property can threaten autonomy since “by design, [it] introduces a series of legal powers that asymmetrically enable owners of infrastructures to exert influence over users of their systems”

1) Neo-managerial practices have created new and effective means of control of immaterial wage labourers within firms. Thus, immaterial wage workers are not becoming increasingly autonomous.

2) The social production of multiple services is receding and taken in charge by capitalist production: cooking, cleaning, driving, teaching, caring etc.

3) “Peer production” processes occurring on capitalist platforms are elicited, driven and nudged by capital rather than properly spontaneous and autonomous.

4) It is true that the products of CBPP are indirectly exploited by capital, but this process does not substantially differ from the indirect exploitation of previous forms of non-market production – the state production of roads and bridges as well as the labour of social reproduction undertaken in the private sphere.

(2006, p. 161). The choice between property vs. commons is the central question underlying debates over net neutrality, intellectual property and digital rights management. Net neutrality is the principle that internet service providers (ISPs) must treat all internet communications equally. Without net neutrality, ISPs can facilitate, slow down or block as they wish the different communications passing through their proprietary infrastructures; and it is to be expected that they will charge content producers to get their information prioritized. Net neutrality thus represents a regulation meant to limit the powers that usually come with property. Benkler champions an even more radical option: the emergence of a wireless infrastructure owned in common by all users and controlled by none. He argues that this option becomes feasible thanks to the transformation of the cost structure brought about by the switch from broadband to wireless networks. The main remaining hurdles are legal in his view. Moreover, the enclosure of information commons through reinforced intellectual property rights, reduces the expressive possibilities opened to individuals and the availability of the inputs necessary for CBPP. Digital rights management, as we saw earlier¹⁵⁰, consist in designing personal computers and other connected devices in a way that technically enforces intellectual property rights. They tend to transform personal computers from hackable, general-purpose devices that can be reconfigured overtime by their owners, into devices that prescribe a limited range of actions authorized by manufacturers and laws.

In spite of its many assets, the main limit of Yochai Benkler's approach comes from its indifference to the distribution of the economic value generated by peer producers. The fact that the GAFA indirectly exploit the unpaid work of commons-based peer producers by using digital commons for profit, that they (and other tech companies) directly exploit some unpaid skilled contributions realised on their platforms (e.g., free translations for LinkedIn, Huffington Post affair¹⁵¹), and that youtubers or Etsy sellers – not to mention gig workers – are poorly remunerated relatively to the profits they generate for platforms, have not been central concerns of Benkler's work for many years. In that, it is illustrative of the predominantly liberal spirit that characterized the free software and free culture movements as they developed against the IP-based model of cognitive capitalism in the 1990's and the 2000's. As he puts it: "Most of the battles of the 1990s and 2000s focused on individual freedom and the relative domains of market and nonmarket, rather than on distribution" (Benkler 2019b). It is this shortcoming that encouraged the development of the Marxist-oriented academic literature on "digital labour" – though I have argued this notion does not necessarily frame the problem in the best possible terms. In *"The Wealth of Networks"*, Benkler does not question once the absence of remuneration of peer producers. Monetary rewards for volunteer contributions even appear suspicious as they risk to crowd-out intrinsic motivations. In that context, commons-based peer production will remain structurally limited by the fact that it is fed by volunteer contributions undertaken by individuals in their leisure time – when it is not done by employees of capitalist firms such as IBM. Contributors thus cannot make a living out of CBPP and have to continue working for capital most of the day to survive in our society. CBPP is not self-sufficient as it

¹⁵⁰ Chapter 2, "Practices and Values of Free and Open Source Software"

¹⁵¹ See Chapter 2, « Frontiers of work »

does not enable the reproduction of its workforce. It remains dependent upon the capitalist mode of production. Against this backdrop, it is “no more a mode of production than a charity soup kitchen” (Kleiner 2010, p. 22). In a recent article, Benkler developed a critical assessment of the last 25 years of the movement for internet freedom and digital commons and of his role within it. The first lesson he draws is that:

“1) *Companies and countries can usually sustain focused strategic efforts for longer and more actively than distributed networks of users. They can and do use these advantages strategically to re-centralize control over consumers and voters using mechanisms that are layered over or circumvent the still-open parts of the ecosystem. This is not true in all cases; Wikipedia has enough activated users that they are able to overcome concerted efforts to distort information; major FOSS development projects of core pieces of infrastructure beat out proprietary solutions. But, as Wikipedia approaches its 20th anniversary, we have to recognize that these major examples of successful distributed commons-based social production continue to be our prime examples*” (Benkler 2019a).

Such a recognition from Benkler is a mark of lucidity and intellectual honesty. Nonetheless, should it really come as a surprise that volunteers producing digital commons cannot sustain efforts that are as active and stable as the ones of capitalist enterprises and public administrations in a world where investments are primarily driven by profit perspectives and where these volunteers must work for capital most of the day to survive? Individuals are now able to afford some basic means of information production and communication and this fact has significant implications that Benkler forcefully describes. Still, as Tony Smith puts it, “in a capitalist society these investments will invariably be dwarfed by the financial resources devoted to investments in the production and distribution of commodities for profit” (2012).

The central focus of Yochai Benkler is the boundary between market and non-market production. Consequently, he does not consider the differences between various sorts of existing or conceivable market-oriented agents; the distinction between individual freelancers, transnational capitalist corporations, or worker cooperatives for instance, is beyond the scope of his analysis. In 2006, his critiques were uniquely directed against the industrial information economy, whereas the capitalist actors of the networked information economy did not represent a threat in his view. They were encouraged to instrumentalize CBPP and develop peer production on their platforms, so as to allow the development of social production and its associated freedoms. It is true that Benkler has progressively become more critique of the GAFAs and that it is easy to judge today's views that were expressed 15 years ago. Indeed, the issues posed by data-related surveillance and behavioural manipulation were much less salient then than they are now (Zuboff 2015). Nonetheless, if we consider how rapidly distributed computing devices have turned from means of expression in the hands of individual users into means of surveillance and control in the hands of corporations and governments, *from personal megaphones to corporate wires* so to say, it seems that Benkler has put too much trust in capitalist enterprises – in their compatibility with, and even their ability to promote, individual freedoms. In that respect, the attempt to completely focus the scientific analysis and political struggle on individual freedoms *per se* at the expense of the issue of wealth distribution, seems

to have led to terrible consequences regarding both matters. The indirect exploitation of CBPP by the GAFa for instance, is not simply an issue of economic injustice. It has massive consequences in terms of individual freedoms: Google's android operating system, that is, possibly the most powerful surveillance system in human history, is based on Linux.

The prediction made by Tony Smith in 2012 in a critical assessment of Benkler's book has largely been confirmed:

“If some version of democratic socialism is not instituted the emancipatory promise of the internet is doomed to be broken, just as the emancipatory promises of earlier revolutions in communications technologies were broken again and again. The immense emancipatory promise of commons-based peer production will only be fulfilled after a fundamental transformation of production relations throughout the economy.” (Smith 2012)

The affordances of the networked information environment (personal computers and the internet) provided various potentialities. Unsurprisingly, the dominant social forces in our societies (capital and states) have been able to actualize the potentialities that better suited their interests, while stifling the others to a great extent. They biased digital technologies towards their usual aims of profit, control, and surveillance. In spite of some significant successes, the struggles to regulate the different layers composing the global communications infrastructures as commons rather than property, have not been able to stop this trend. The GAFa especially, have found “ways of constructing new bottlenecks above and below the open layers, creating new toll booths and points of observation, and using the ‘free’ nature of the open parts of the infrastructure as low cost input from which to mine our ‘biopolitical public domain,’ as Julie Cohen puts it” (Benkler 2019a). The latter expression refers to the massive amounts of data extracted from our daily lives to feed algorithms that aim to predict and modify human behaviour for profit (Zuboff 2015).

Yochai Benkler “assign[s] a very significant role to technology” (2006, p. 16). His thesis is significantly – though cautiously – technophile in that it argues that digital technologies may bring about positive social and political change (debate (C)). However, Benkler cannot properly be portrayed as a techno-determinist (debate (A)) for the reasons mentioned above. He considers technology creates affordances which influence but do not determine social outcomes, since these also depend on social practices and legal systems. I do agree with this point and have already adopted the notion of affordances. Nonetheless, a first point that deserves to be kept in mind – and which complements rather than contradict Benkler – is that today's technology and its associated affordances, is the result of a social construction, of a history of social choices between different viable technical paths. The historical process that led to the diffusion of personal computers and the existing internet architecture is long, complex and filled with contingencies. We saw for instance¹⁵² that for more than a decade, IBM continued to produce large and expensive computers though the development of micro-computers had become technically feasible. These only emerged when Californian students influenced by the 1960's radical culture started to invest their hopes in micro-computing as a means of social transformation.

¹⁵² Chapter 2, « A Brief History of Free and Open Source Software »

More importantly, I still think that Benkler over-estimates the historical role of technology and precisely to the same extent that he under-estimates the one of capital and class domination (debate (A)). In the chapters 6 and 7 of “*The Wealth of Networks*”, he analyses the limits of mass media for the creation of an ideal democratic public sphere and the improvements that a networked public sphere can bring in that respect. He convincingly depicts the technical architecture of mass media (“a one-way, hub-and-spoke structure, with unidirectional links to its ends, running from the centre to the periphery”), the associated costs structure (expensive means of information production and communication and cheap reception devices), and some of its social implications: a model of passive consumption of finished information goods produced in mass by a limited number of emitting centres (2006, p. 179). He then describes the main institutional models that emerged in that context: commercial media financially dependent on advertising, state-owned and controlled media, and a hybrid model exemplified by the BBC consisting in “state-based funding and monopoly with genuine editorial autonomy” (2006, p. 189). No doubt that these are the main institutional models which emerged for mass media and that they represent effective ways to organize media infrastructures with the outlined technical and economic characteristics. Still, this historical account tends to leave the reader with the impression that the techno-economic characteristics of mass media generated a public sphere platform that is owned and controlled by the dominant class¹⁵³, while our main hope for the democratization of the public sphere should be invested in the new networked means of production whose techno-economic characteristics enable to evade such centralized ownership and control.

On the contrary, I contend there are a multiplicity of possible institutional models which, on the one hand are compatible with the techno-economic characteristics of mass media, and on the other hand, allow to escape the problems associated with state property and with privately owned commercial media (see for instance Cagé 2015; Rimbart 2014). Yochai Benkler probably would not disagree but his book leaves such possibilities out of the picture. Consequently, it suggests that the main institutional models currently existing exhaust the realm of the technically feasible. Yet, the fact that mass media generally “serve to mobilize support for the special interests that dominate the state and private activity, and that their choices, emphases, and omissions can often be understood best [...] by analysing them in such terms” as Herman and Chomsky (1994) put it, has nothing to do with technical necessity and not that much either with technical affordances – it is primarily a matter of class domination. Mass media have not disappeared in the digital age. They still profoundly shape public discussions and there are no reasons to believe they will be replaced by networks of amateurs in the near future¹⁵⁴. Struggling for institutional alternatives to private or state property in this field, is as possible and necessary today as it was in the industrial age.

¹⁵³ Benkler shows however, that the radio could have taken another path in the early 1920’s and that it adopted a commercial model after a series of economic negotiations and regulatory changes. Generally, his account also suggests that there is more institutional flexibility in the early days of a communication medium (e.g., radio, press, television) when organizational routines and economic models are not settled yet, which is in line with Thomas Hughes’ concept of technological momentum (Hughes 1987)

¹⁵⁴ It seems, however, that Yochai Benkler has become much more sensitive to this matter in his recent works (e.g., Benkler, Faris, et Roberts 2018).

The Common(s) as a mode of production

Alfonso Giuliani and Carlo Vercellone (2019) have distinguished the theory of the common as a political principle developed by Pierre Dardot and Christian Laval from the theory of the common as a mode of production developed by Michael Hardt and Antonio Negri in order to criticize the former and support the latter. I find their distinction very relevant but my account differs from theirs in two respects: first, I argue in favour of the theory of the common as a political principle, second, I enlarge the category of the common (in the singular) as a mode of production so as to include within it the theories of the commons (in the plural) developed by authors such as Michel Bauwens and Vasilis Kostakis, Dmitry Kleiner, or Jeremy Rifkin.

The two quotations of Karl Marx displayed at the beginning of this chapter exemplify the two elements of Marxism which Cornelius Castoriadis has distinguished and opposed. The assertion that men make their own history but under circumstances that are given and transmitted from the past stands among the purest illustrations of the revolutionary element in Marx. It is perfectly compatible with Castoriadis' social ontology – with its reflection on the relation between the instituted and the instituting society –, upon which Dardot and Laval build their own political theory. On the contrary, the idea that “communism is not [...] a state of affairs which is to be established, an ideal to which reality [will] have to adjust itself” but the “real movement which abolishes the present state of things” and whose condition “result from the premises now in existence” (Marx et Engels 1845), is closely related to the deterministic element of Marxism. In spite of the many differences between the various theories of the common(s) as a mode of production, they are all in line with this second quotation.

This does not mean that they can all be considered deterministic or Marxist, but that they all have a certain proximity with the Marxist theory of history which I will try to highlight and elucidate. This Marxist inspiration is explicit in the case of Hardt and Negri or Bauwens and Kostakis (though only the former can properly be considered Marxists), while it is implicit and possibly unconscious in the case of Rifkin (who is certainly not a Marxist). The perspective on the transition to post-capitalism developed by Bauwens and Kostakis (and other authors of the P2P Foundation¹⁵⁵) is reformist and mildly techno-determinist. The perspective developed by Hardt and Negri (and other post-operaist authors) is revolutionary and not techno-determinist. The perspective developed by Jeremy Rifkin is apolitical and strongly techno-determinist; it fully dissolves the revolutionary element of Marx's theory of history within the deterministic one.

Still, for all these theories, the common(s) “presents itself, in a Marxist sense, as a new mode of production in the process of emerging, which unfolds within capitalism itself and could become dominant compared to the logics of the state and the capitalistic market economy” (Giuliani et Vercellone 2019). Their argument is framed (more or less explicitly) in terms of contradictions between the development of productive forces and capitalist relations of production. Capitalist relations of production have powerfully developed the forces of

¹⁵⁵ I will often speak of only Michel Bauwens and Vasilis Kostakis for the sake of concision, but their co-authors and colleagues of the P2P Foundation should be kept in mind for their crucial contributions, especially Alex Pazaitis, Alekos Pantazis, Vasilis Niaros, Christina Priavolou, and Chris Giotitsas.

production for centuries but would now be starting to fetter them. Capitalism has thus played its progressive role by developing the productive forces and creating the conditions for the emergence of a new mode of production. Social emancipation would be on the side of the development of production which capital now restrains. And a new commons-based mode of production would already be in the making within capitalism, stimulated by it, and ready to supplant it; just as capitalism developed within feudalism as a new society within the shell of the old.

The reformist perspective: Michel Bauwens & Vasilis Kostakis

The authors of the P2P Foundation have developed a sophisticated and original political economy that aims to identify the post-capitalist aspects of the digital economy and push them further to fully actualize their emancipatory potential.

“Not since Marx identified the manufacturing plants of Manchester as the blueprint for the new capitalist society has there been a deeper transformation of the fundamentals of our social life” (Bauwens 2005; Bauwens, Kostakis, et Pazaitis 2019).

This introductory sentence of a founding article of Michel Bauwens, was recently re-asserted as the beginning of the *Commons Manifesto* written by the P2P theorists. It gives a striking insight over the historical breadth of the evolutions they see at work in today’s society. The novelty would consist in the emergence of a new social, political and economic dynamic: peer to peer (P2P). P2P both refers to a type of social relations in human networks and the technological infrastructure that enables it to spread and scale up. P2P thus consists in a “social/relational dynamic through which peers can freely collaborate with each other and create value in the form of shared resources” (Bauwens, Kostakis, et Pazaitis 2019, p. 2). The expression initially emerged with the development of information and communication technologies, to describe a network in which computers can interact without going through a separate computer server. Thus, in a P2P network, “peers are equally privileged, equipotent participants in the application that the network performs” (ibid, p. 2). Equipotentiality means that there is no *a priori* selection to participation: the filtering of contributions is generally made *a posteriori*, while one can submit his contribution without asking for permission. However, P2P social relations are not limited to the digital sphere: “P2P can generally be synonymous with ‘commoning,’ in the sense that it describes the capacity to contribute to the creation and maintenance of any shared resource” (ibid, p. 3). They adopt David Bollier’s (2014) definition of the commons as a shared resource, co-governed by a community through the creation of social rules. Commons were limited to the local governance of natural or man-made resources until recently, but thanks to internet-enabled P2P technologies “small-group dynamics can now apply at the global level” (ibid, p. 3). The argument is in line with the late André Gorz: it claims that a large scale self-managed economy was impossible before the emergence of digital technologies.

“The Internet creates opportunities for social transformation. In the past, with pre-digital technologies, the costs of scaling regarding communication and coordination made hierarchies and markets necessary as forms of reducing these costs. Hence societies that scaled through their adoption ‘outcompeted’ their tribal rivals. Today, by contrast, it is also possible to scale projects through new coordination mechanisms, which can allow small group dynamics to apply at the global level. It is, thus, possible to combine ‘flatter’ structures and still operate efficiently on a planetary scale. This has never been the case before” (Bauwens, Kostakis, et Pazaitis 2019, p. 4).

Since they largely insist on the deep transformation of social structures entailed by digital technologies¹⁵⁶, P2P theorists can be considered as mild techno-determinists (debate A) and they do recognize themselves as such. However, their approach substantially differs from strong techno-determinism. Indeed, they explicitly agree with Andrew Feenberg that technology is a field of struggle between conflicting interests and values, that it is shaped and appropriated by different social groups with contradicting aims (ibid, p. 33). Still, in their view, digital technologies have a democratizing effect since they provide capacities for large scale organization to non-hierarchically organized groups which did not have them before. In so far as they insist on the emancipatory affordances created by digital technologies, they appear significantly technophile (debate C). However, this techno-philia should not be exaggerated for different reasons: P2P theory harshly criticizes cornucopianism and has some affinities with the degrowth movement such as its promotion of low-techs (e.g., self-constructed open hardware) and the local scale (as an important though not exclusive scale for politics, economy and culture) (Kallis et al. 2018; Kostakis et al. 2018). Thus, I would describe it as mildly technophile. It is also significantly antitechnocratic in that it criticizes hierarchical organizations and values horizontal networks (debate B).

P2P theorists emphasize the importance of three crucial capacities created by digital technologies: a capacity for many-to-many communication, a capacity for self-organization resulting from this communicational dynamics, and a capacity to create and distribute value in new ways. The latter implies that P2P has enabled the rise of peer production (or “P2P production”), which would not yet represent a full mode of production for the above-mentioned reasons – it is not self-sufficient yet, as it is unable to reproduce independently its factors of production (especially labour). Still, it is a prototype of a mode of production which could mature to become independent and dominant.

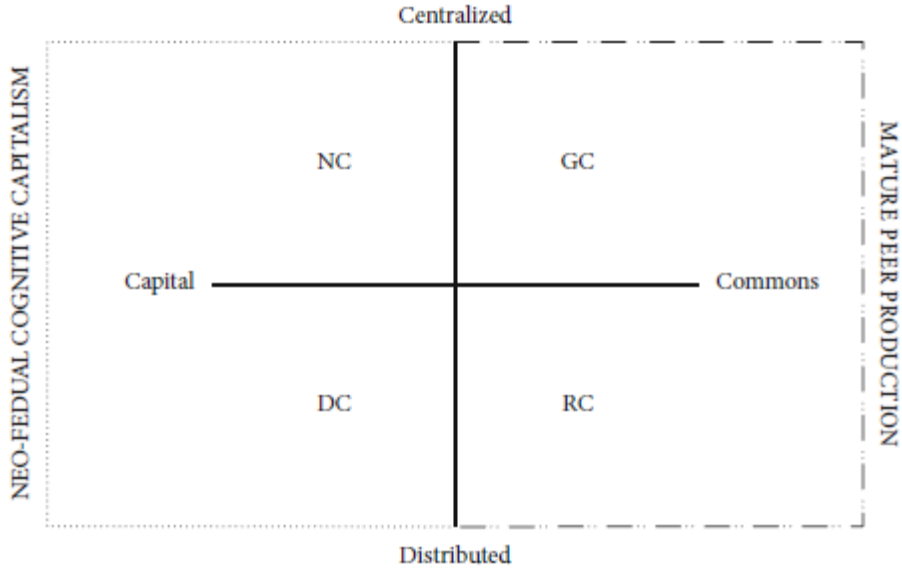
Vasilis Kostakis and Michel Bauwens (2014) have argued that three value models were currently competing for dominance: “traditional proprietary capitalism”, “neo-feudal cognitive capitalism”, and “the hypothetical model of mature peer production”. The first value model, they argue, remains dominant but rapidly declines in importance; the second is reaching dominance; and the third is only emerging. P2P theory in general and this argument in particular is strongly inspired by both post-operatism and the work of Yochai Benkler. Here, Bauwens and Kostakis are slightly more in line with Benkler since they include in the same category (traditional proprietary capitalism) both industrial capitalism and the first form of cognitive capitalism, whereas post-operatist authors exacerbate the difference between industrial and cognitive capitalism. In traditional proprietary capitalism, labour is exploited by capital which realizes the value it creates by selling its products (including information) as commodities on the market. Part of the value created by labour is then redistributed to workers in the form of wages or social provisions (e.g., unemployment benefits, pensions, public health). The authors contend this first value model is destined to decline since it is ridden with an insurmountable contradiction. On the one hand, it is based on a false notion of material abundance in a finite world, which inevitably collides with ecological limits. On the other hand, it puts strong

¹⁵⁶ “We build on the idea that peer-to-peer infrastructures are gradually becoming the general conditions of work, economy and society” (Kostakis et Bauwens 2014, p. VIII)

proprietary constraints on the circulation of information and knowledge. Therefore, “while it is rapidly overburdening the carrying capacity of the planet, it simultaneously inhibits the solutions humanity might find for it” (2014, p. 13).

However, the main force pushing forward the two other value models is the rise of P2P technologies and social relations. Contrarily to Yochai Benkler who, in “*The Wealth of Networks*” (2006), considered the main battle to be fought was against the industrial information economy (that is part of traditional proprietary capitalism), Michel Bauwens already argued in 2005 that the main struggle would oppose two rising forms of networked economy: neo-feudal cognitive capitalism and commons-based peer production. The former corresponds to the aspects of peer production that are immanent to capitalism and dominated by financial capital, while the latter refers to the aspects of peer production that are transcendent to capitalism (or commons-based) and may surpass it by maturing into a full mode of production.

These two value models are associated to four technological regimes representing different scenarios for the future of the economy: netarchical capitalism, distributed capitalism, resilient communities, and global commons. The following figure presents these four technological regimes by structuring them around two axes: the horizontal axis distinguishes a for-profit orientation (where the profit motive dominates over any social goal) from a for-benefit orientation (where social goals prevail over the profit-motive); the vertical axis distinguishes centralized technological control (and an orientation toward globality) from distributed technological control (and an orientation toward localization).



Extracted from Kostakis et Bauwens (2014, p. 18)

FIGURE 3.1 *Two axes and four future scenarios*

I have already presented the notion of netarchical capitalism as a synonym of platform capitalism¹⁵⁷. Netarchical capitalism attempts to tame the commons and exploit networked social cooperation by encouraging its development on centrally controlled proprietary platforms. Like post-operaists, P2P theorists consider netarchical capital is “parasitic and rent-seeking” (Bauwens, Kostakis, et Pazaitis 2019, p. 37). Users create and share use value on netarchical platforms, which has some emancipatory effects; but platform owners realize the exchange value, thereby exerting extreme new forms of exploitation. Distributed capitalism would match the distributed control over a technological infrastructure with a focus on capital accumulation. Distributed capitalism is promoted by a right-libertarian ideology according to which hierarchical institutions could be dissolved in market exchange while everyone would become an independent capitalist. I have chosen not to use this category in my analysis of platform capitalism, since I see no convincing example of such a business model. The examples of distributed capitalism proposed by Kostakis and Bauwens are Kickstarter and Bitcoin. I believe the first one is better understood as a capitalist (and netarchical) platform since it is proprietary, while the second appears to me mainly as an exchange currency and a speculative asset rather than as a proper business model. Nevertheless, the notion of distributed capitalism has some virtues within the analytical framework of Bauwens and Kostakis. First, it allows them to highlight a continuum between technological infrastructures that are more or less centralized/distributed. Second, it enables them to develop a convincing critique of right-libertarian or anarcho-capitalist discourses by showing that, in reality, the focus on market competition and profit-maximization necessarily leads to the resurgence of oligarchies.

The “resilient communities” scenario matches a distributed control over P2P infrastructures and a for-benefit orientation with a focus on re-localization. The degrowth, transition towns, and permaculture movements exemplify this approach. They focus on local commons and aim for “a radical relocalization of politics, economics and culture to autonomous and self-sufficient communities, in order to become resilient to mega changes, such as peak oil and climate change” (Kostakis et Bauwens 2014, p. 46). Often, this scenario is associated to the idea that the collapse of the capitalist technosystem is inevitable and that lifeboat strategies should be developed to favour the survival of small communities in a context of generalized chaos. Bauwens and Kostakis regard these movements as “a healthy reaction to global problems” but point out the limits of localism: “the issue is how to organize a global counter-power able to propose alternative modes of social organization on a global scale” (ibid, p. 48). Since resilient communities do not confront the global capitalist economy, they risk getting incorporated to it.

While resilient communities have some resemblances with pre-industrial times, the global commons scenario corresponds to the hypothetical model of mature peer production. Commons-based peer production would represent a new proto-mode of production: “It is developing within capitalism, rather as Marx argued that the early forms of merchant and factory capitalism developed within the feudal order” (Kostakis et Bauwens 2014, p. 51). The global commons approach is in no way hostile to the local commons associated to resilient communities. It simply considers that the new mode of production must be constructed, strengthened, and fought for at every level to build a global counter-power to the capitalist

¹⁵⁷ See Chapter 2, « Platform capitalism ».

economy. Also presented as “cosmolocalism” (Bauwens, Kostakis, et Pazaitis 2019, p. 40), this approach claims that what is heavy (or material) must be local, while what is light (or immaterial) must be global. The new mode of production would thus combine global digital commons of software, knowledge and design, with an in-depth relocalization of material production. A series of CBPP projects have successfully focused on the open design of physical objects such as cars (Wikispeed¹⁵⁸), agricultural tools (L’Atelier Paysan, FarmHack¹⁵⁹), 3D printers (RepRap project¹⁶⁰), or multiple machines considered fundamental to civilisation (Open Source Ecology¹⁶¹). P2P theorists have also argued that the extension of CBPP to the physical realm would soon be facilitated by the increasing distribution of the means of material production:

“P2P relational dynamics [...] are based on the distribution of productive forces. [...] Just as networked computers democratized the means of production of information and communication, the emergent elements of networked micro-factories or what some call desktop manufacturing, such as 3D printing and computer numerical-control (CNC) machines, are democratizing the means of making.” (Kostakis et Bauwens 2014, p. 16)

As years go by, it becomes increasingly clear that much of the hopes that numerous authors (e.g., Bowyer 2004, Gorz 2007, Rifkin 2014) had previously invested in digital fabrication tools was greatly exaggerated. In that context, P2P theorists seem to insist less on the supposed technological trend towards a radical distribution of the means of material production. Still, the relocalization of industrial production in micro-factories anchored in a thick web of social relations remains an important political objective. Such micro-factories would be networked at global scale and mutualize the design of products and machinery.

P2P theorists remark that CBPP projects are generally immersed in an ecosystem consisting of three institutions: a productive community, a for-benefit association, and a commons-oriented entrepreneurial coalition.

Productive community	Linux	Mozilla	GNU	Wikipedia	Wordpress
Entrepreneurial coalition	e.g. Linux Professional Institute, Canonical	e.g. Mozilla corporation	e.g. Red Hat, Endless, SUSE	e.g. Wikia company	e.g. Automatic company
For benefit association	Linux Foundation	Mozilla Foundation	Free Software Foundation	Wikimedia Foundation	Wordpress Foundation

Extracted from Bauwens, Kostakis et Pazaitis (2019, p. 16).

The productive community consists of all the paid and unpaid contributors to a given CBPP project, working in loose collaboration to produce a shared resource. Often, a for-benefit association is also involved in CBPP projects in order to support and maintain the infrastructure of cooperation upon which the productive community depends. It takes the form of a non-profit

¹⁵⁸ <https://wikispeed.com/>

¹⁵⁹ <https://latelierpaysan.org/> ; <https://farmhack.org/wiki/getting-started>

¹⁶⁰ <https://reprap.org/wiki/RepRap>

¹⁶¹ <https://www.opensourceecology.org/>

organisation, but only aims to enable the productive process by safeguarding its infrastructural conditions rather than to command and control it from above. It may protect commons through licenses, manage conflicts between contributors, fundraise, own servers and domain names, engage in education and certification programs allowing the project to thrive etc. A CBPP ecosystem may also comprise a commons-oriented entrepreneurial coalition, “which attempts to create either profits or livelihoods by creating added value for the market, based on shared resources” (ibid, p. 16). Enterprises revolving around commons can be, on the one hand, privately-owned capitalist businesses that seek to maximize profit, or on the other hand, independent self-entrepreneurs or cooperatives that may only seek to secure the livelihood of their members while pursuing social or environmental objectives. Capitalist enterprises would have an “extractive” relation to the commons. They maximize profit based on a logic of “how can I put myself in between and extract a surplus” and do not sufficiently reinvest in the maintenance of the commons ecosystem. On the contrary, for-benefit self-entrepreneurs and cooperatives would tend to have a “generative” relation to the commons. They operate according to a logic of “how can I build a livelihood around my contributions and share it fairly while recognizing natural limits in the process” (ibid, p. 18). Ideally, these enterprises are developed by members of the productive community in order to make a living and reinvest in the maintenance of the ecosystem. In that context, value appears as the peer recognition of the significance of individual contributions as part of a shared effort. Thus, the authors promote “value sovereignty” understood as the development of accounting practices enabling communities to self-determine the value they attribute to different contributions¹⁶².

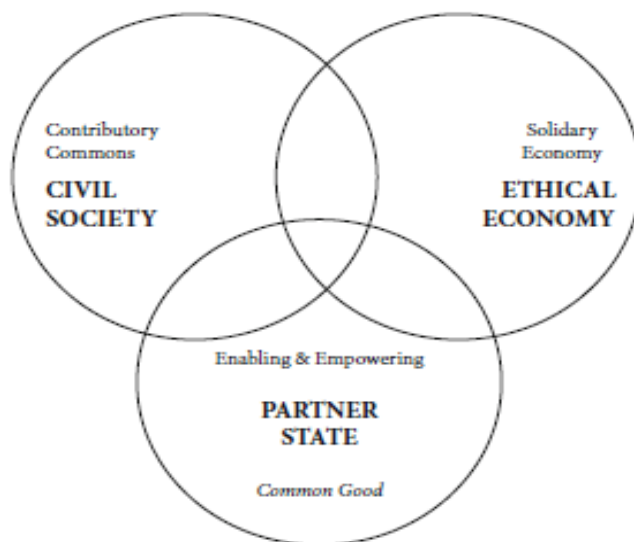
The authors of “*Peer-to-Peer: the Commons Manifesto*” (Bauwens, Kostakis, et Pazaitis 2019) have also proposed to inscribe P2P within a theory of history. The latter revises the Marxist grand narrative in a more reformist manner based on the works of the philosopher Kojin Karatani (2014). In this framework, the historical succession of modes of production is replaced by the succession of modes of social exchange: reciprocity/gift (mode A), hierarchy/state (mode B), market exchange (mode C), association (mode D). We thus find a form of primitive communism at the origin with reciprocity (representing P2P dynamics at local scale), and a form of mature communism at the end of history with associationism (representing P2P dynamics at global scale). P2P theorists retain two major points from Karatani’s approach. First, every social and economic system is multimodal: the different modes of exchange constantly coexist and struggle against each other to achieve dominance. Second, “political and social revolutions occur as the result of previous structural changes, not as a prior condition to it” (ibid, p. 50). In much the same way as capitalism progressively developed within feudalism before political revolutions occurred, the development of commons will not result from a revolution but condition its occurrence (in the very long run)¹⁶³.

The strategy of transition to post-capitalism envisioned by P2P theorists goes through the development of a synergy between commons-based peer production and the cooperative

¹⁶² The objective of value sovereignty, of an internal transformation of the market sphere through the development of non-capitalist market entities, represents the main difference between P2P theory and the ideas of André Gorz who, as we saw, focused on the promotion of the non-market sphere and non-quantifiable values. Beyond this point, the similarities between the late André Gorz and P2P theory are striking.

¹⁶³ This claim is also central to the arguments of Dmitry Kleiner (2010) or Erik Olin Wright (2019).

economy. The protection of commons under reciprocal licenses, such as the peer production license (PPL) proposed by Dmitry Kleiner (2010), is a key element of this strategy. A commons protected by a reciprocal license can be used by a capitalist enterprise only if it contributes to its development or pays a license fee. Individuals, non-profit organisations or cooperatives on the other hand, can use and share this commons without this restriction. The logic underlying such licenses is very different from the one characterizing the creative commons (CC) non-commercial (NC) license. The latter forbids commercial activities based on the commons to keep them entirely in the non-market sphere, while reciprocal licenses aim to foster a counter-hegemonic economy. It encourages peer producers to develop cooperatives around the commons they create, while directing a stream of income from capitalist enterprises (paying fees) to the commons. P2P theorists also call for the development of cooperatives of a new kind: “open cooperatives” which would “internalize negative externalities; adopt multi-stakeholder governance models; contribute to the creation of digital and physical commons; and be socially and politically organized around global concerns, even if they produce locally” (Bauwens, Kostakis, et Pazaitis 2019, p. 57). Open cooperatives are meant to overcome the main shortcomings of traditional cooperatives: the fact that they tend to adopt exploitative practices as they face market competition and that their ownership structure pushes to privilege the interests of their owners at the expense of wider social goals. Moreover, P2P theory encourages the organization of commoners and commons-oriented entrepreneurial coalitions at every geographical level (e.g., local, regional, national, transnational) in new institutions (e.g., chambers of the commons, assemblies of the commons). Similarly, it encourages coalitions between political parties (e.g., Left parties, Green parties, Pirate parties) at every scale around the support to the commons.



Extracted from Bauwens & Kostakis 2014, p. 61

Finally, it calls for the transformation of the state into a “partner-state”. The partner-state would be the equivalent of a for-benefit association at the macro-level: it would enable the creativity and productivity of its civil society by providing infrastructures for CBPP ecosystems. It should also equalize access to these infrastructures to avoid territorial inequalities. It would still take on the solidarity function of the welfare state but “de-bureaucratize” its services through “the commonification of public services and public-commons partnerships” (ibid, p. 57).

Progressively, it could lose its separateness from civil society through the generalization of radical participatory processes. The partner-state should also be used to implement “revolutionary reforms” (Gorz 1964) – reforms that are acceptable by the existing system but create the conditions for its transformation. The main revolutionary reform advocated by P2P theorists is the universal basic income, which should limit workers’ dependency on wage labour and liberate time to engage in the commons economy.

A new mode of production?

Before discussing whether or not commons-based peer production should be understood as a new mode of production on the rise, we may start by questioning the robustness of the concept of peer-to-peer. Peer-to-peer would be synonymous to commoning, it would also represent a horizontal form of social relations between individuals interacting in networks, as well as the form of the technological infrastructures underlying work, economy and society in the digital age and allowing the scaling up of small-group horizontal dynamics. To what extent a notion created to describe a specific structure of computer networks (the one envisioned by the utopian pioneers of the internet) can properly describe the general form taken by digital technologies, social and productive relations in the digital age as well as “the dominant form of relationship in nomadic hunter-gathering societies” (Bauwens, Kostakis, et Pazaitis 2019, p. 47). This hyper-extensive use of the concept sharply contrasts with the one of Dmitry Kleiner for instance, who has argued that even the development of the World Wide Web¹⁶⁴ was already a treason of the peer-to-peer structure of the internet: “The Web is neither distributed, nor is it peer-to-peer; it is a client-server technology. The [website] publisher has full control of the content and options available to users” (2010, p. 15).

On the one hand, the concept of peer-to-peer is used by the P2P foundation to describe the form of social relations which would become dominant today as a result of the diffusion of digital technologies. In this respect, it tends to overestimate the determinism of technology over society (consistently with the mild techno-determinist label) and to underestimate the heterogeneity of contemporary social and productive relations by putting the same label over those that characterize peer production projects, platform companies, more conventional companies adapting to the digital age, as well as every social interaction mediated by digital technologies. On the other hand, the concept of peer-to-peer would apply far beyond the digital sphere to describe all forms of horizontal social dynamics. In this case, it risks giving an impoverished description of the social-historical, by reducing it to a sum of inter-individual relations while a large part of its activity actually operates at a collective, anonymous and diffuse level as Castoriadis argued:

“The social-historical is neither the unending addition of intersubjective networks (although it is this too), nor, of course, is it their simple 'product'. The social-historical is the anonymous collective whole, the impersonal-human element that fills every given social formation but which also engulfs it, setting each society in the midst of others, inscribing them all within a continuity in which those who are no longer, those who are elsewhere and even those yet to be born are in a certain sense present. [...] In short, it is the union and the tension of the instituting society and the instituted society, of history made and history in the making.” (Castoriadis 1975, p. 160-161)

Now, can we understand commons-based peer production as a mode of production developing within capitalism to surpass it, comparably to the way capitalism developed within feudalism? We have seen that P2P theory adopts and substantially revises the Marxist historical narrative: it abandons strong techno-determinism, the idea of historical necessity and of a

¹⁶⁴ The World Wide Web is an application that runs on top of the Internet and is accessed through a web browser (e.g., Internet Explorer, Mozilla Firefox, Google Chrome). Created in 1989 and opened to the public in 1993, the Web quickly became the most important internet technology for the general public which has often led it to use both terms (Web and internet) as synonyms.

comprehensive science of history etc. Still, it largely reconstitutes the fundamental scheme according to which human history can be read through the contradictions between the progressive development of productive forces and social relations of production. The development of productive forces goes with the rise of a new social class and new relations of production which contradict the established ones and their juridical translation as property relations. The established relations of property increasingly fetter the development of productive forces, until a revolution occurs to overthrow the old dominant class and raise to legality the rising class and its associated relations of production. Similarly, P2P theory argues that digital technologies enabled the rise of new relations of production practiced by a new class of commoners and composing CBPP as a new mode of production, whose superior productivity gives it the potential to surpass capitalism. According to Castoriadis, this interpretative grid of macro-historical changes improperly extrapolates to the entire history a process which occurred only once with the phase of the bourgeois revolutions:

“It more or less faithfully describes what took place at the time of the transition from feudal society, or more precisely, from the hybrid societies of western Europe from 1650 to 1850 (where a well-developed and economically dominant bourgeoisie ran up against absolute monarchy and the remains of feudalism in agrarian property and in legal and political structures) to capitalist society. But it corresponds neither to the breakdown of ancient society and the subsequent appearance of the feudal world, nor to the birth of the bourgeoisie, which emerged precisely outside of and on the fringes of feudal relations¹⁶⁵. It corresponds neither to the constitution of the bureaucracy as the dominant order today in countries that are in the process of industrialization, nor finally to the historical evolution of non-European peoples. In none of these cases can we speak of a development of the productive forces embodied in the emergence of a social class within the given social system, a development which 'at a certain stage' would have become incompatible with the maintenance of the system and would therefore lead to a revolution giving the power to the 'rising' class.” (Castoriadis 1975, p. 27)

Castoriadis also recalls that for thousands of years, civilisations and empires developed and collapsed based on similar technological infrastructures and on what appears from today's perspective as an economic stagnation. Further, if we agree with Hannah Arendt (1963, p. 35-41) that the idea and phenomenon of revolution did not properly exist prior to modern times, the scheme of social transformation once formulated by Marx is even more difficult to maintain. It is hard to see how it could properly describe other macro-historical changes than modern bourgeois revolutions, nor how it could constitute the definitive model to think of future social transformations. It encourages to think the transition from capitalism to post-capitalism by analogy with the particular historical process that the transition from feudalism to capitalism represents. Such an analogy can provide some guidance (in spite of its numerous limits) but it should not limit today's political imagination.

Karl Marx explicitly developed this analogy between the transition from feudalism to capitalism and the transition from capitalism to communism:

¹⁶⁵ The emergence of the bourgeoisie on the fringes of feudal relations is actually more comparable with the development of a common(s)-based mode of production on the fringes of capitalist relations of production envisioned by post-operatism and P2P theory, than with Marx's depiction of the capitalist organization of labour as the objective foundation for socialism.

“The means of production and of exchange, on whose foundation the bourgeoisie built itself up, were generated in feudal society. At a certain stage in the development of these means of production and of exchange [...] the feudal relations of property became no longer compatible with the already developed productive forces; they became so many fetters. They had to be burst asunder; they were burst asunder. [...] A similar movement is going on before our own eyes. Modern bourgeois society, with its relations of production, of exchange and of property, a society that has conjured up such gigantic means of production and of exchange, is like the sorcerer who is no longer able to control the powers of the nether world whom he has called up by his spells.” (Marx et Engels 1848, p. 41).

He repeatedly compared the revolution to a form of birth giving: the old society is pregnant with the new one and force plays the role of the “midwife”. He also argued that it is the development of capitalism that lays the objective foundation of a new mode of production and even aimed to deduce the necessary advent of communism from the scientific analysis of capitalist development. What would prefigure socialism within the advanced capitalist society is not primarily the alternative institutions autonomously created by the working class (e.g., cooperatives, unions, associations) but the capitalist centralisation of means of production and “socialisation” of labour in large factories:

“One capitalist always kills many. Hand in hand with this centralisation, or this expropriation of many capitalists by few, develop, on an ever-extending scale, the cooperative form of the labour process, the conscious technical application of science, the methodical cultivation of the soil, the transformation of the instruments of labour into instruments of labour only usable in common, the economising of all means of production by their use as means of production of combined, socialised labour, the entanglement of all peoples in the net of the world market, and with this, the international character of the capitalistic regime. [...] The monopoly of capital becomes a fetter upon the mode of production, which has sprung up and flourished along with, and under it. Centralisation of the means of production and socialisation of labour at last reach a point where they become incompatible with their capitalist integument. This integument is burst asunder. The knell of capitalist private property sounds. The expropriators are expropriated.” (Marx 1867, p. 542)

The enclosure movement saw the expropriation of the private property of the immediate producers and the establishment of capitalist private property. Capitalist production would then progressively concentrate the means of production and socialise the labour process in a way that would eventually contradict capitalist property relations, thus contributing (with the other contradictions of capital) to provoke a socialist revolution realizing the expropriation of the expropriators.

As early as 1955, Castoriadis has criticized this Marxist analogy and strictly differentiated the task of the socialist revolution from the model of the bourgeois revolution. In his view, the bourgeois revolution was purely negative whereas the socialist revolution would have to be essentially positive. In the first case, “the new society is fully prepared within the old” and “most of the revolution is achieved before the revolution”: workers and their capitalist bosses are already gathered in manufactures, while peasants still pay taxes to aristocratic landlords

who serve no economic function (their exploitation is purely parasitic). The bourgeois revolution “bases itself upon what is already there, it merely elevates to legality a state of affairs by suppressing a superstructure that is already unreal in itself” (Chaulieu 1955). To the contrary, the socialist revolution has to create new relations of production, it must radically transform work and its organization. Capitalist development creates some of the presuppositions of socialism (e.g., a numerous class of industrial workers, a highly developed industry) before the revolution. However, there are no socialist relations of production developed within advanced capitalist societies that may be compared to the capitalist relations of production which existed in late feudal societies. Castoriadis harshly criticizes Marx on that point: the capitalist socialisation of labour does not represent the premise but the absolute contrary of a socialist mode of production. The capitalist socialisation of labour is antagonistic, it is founded upon and constantly deepens the bureaucratic opposition between direction and execution. It systematically excludes workers from decision-making over production to the benefit of a separate class of managers. Socialist relations of production would be those that surpass this opposition to realize workers self-management; they have absolutely no chance to arise as a logical development of the bureaucratic rationalisation of the labour process. Consequently, Castoriadis claims that the task of the socialist revolution is not simply to legally abolish capitalist property but to positively create new relations of production: “The capitalist transformation of society *ends* with the bourgeois revolution, the socialist transformation of society *begins* with the proletarian revolution” (Chaulieu 1955).

The position of P2P theory in this debate stands somewhere between Marx and Castoriadis:

“The weakness of Marxist theory is that there is no new mode of production. However, today this new mode of production actually exists.” (Bauwens et Lievens 2015, p. 64)

On the one hand, it agrees with Castoriadis that the capitalist socialisation of labour in industrial factories had nothing to do with a socialist mode of production: there was no new society prepared within the old in the industrial age. Yet, against him (and consistently with Gorz), it draws from this diagnosis the conclusion that there were no possible emancipatory alternative to capitalism in the industrial age. A socialist revolution could not have created new and emancipatory relations of production. In the absence of a widely distributed access to personal computers and the internet, the alternative was between small group dynamics (local autonomy) and heteronomous modes of coordination (bureaucracies and markets). On the other hand, P2P theory adopts the Marxist scheme in an original way: the only way to surpass capitalism is to progressively develop a new mode of production within capitalist society and CBPP is such a mode of production. However, this new mode of production does not develop as a product of the capitalist socialisation and real subsumption of labour but – in line with post-operatism – as the expression of a regression of capitalist control and an increasing autonomy of cognitive labour and peer production.

What are the limits of P2P theory’s transition strategy to post-capitalism as well as its version of the Marxist historical narrative and analogy with the transition to capitalism? A first point is that the idea that commoners today represent a social class in Marx’s sense is rather questionable. The immense diversity of commons around the world and their inscription in very different contexts make it difficult to speak of commoners as one social class. To what extent the socioeconomic situation of an African peasant whose subsistence depends on local

commons of land and irrigation may be compared to the one of a European student freely contributing to Wikipedia or of an American employee of IBM paid to contribute to Linux?

More fundamentally, P2P theory risks to overestimate the emancipatory potential of commons-based peer production by presenting it as a new mode of production whose progressive development is our – only or best – way out of capitalism. No doubt that CBPP is an important phenomenon with emancipatory potentialities that deserve strong support, but its centrality in the struggles for post-capitalist construction may be overestimated by P2P theory. In short, CBPP is certainly *part of* the solution but it might not be *the* solution. Surpassing capitalism necessarily implies the creation of an alternative mode of production and I believe this mode of production should be conceived in terms of commons and based on multiple commons; it would thus consist in commons-based production more generally. However, the institution of such a mode of production does not have to be thought along the lines of the Marxist theory of history and in analogy with the emergence of capitalism, nor even approached primarily through techno-economic lenses – this is a key difference between theories of the common(s) as a mode of production and the theory of the common as a political principle.

In what ways, the commons-based alternative to capitalism would be larger than CBPP? The notion of peer production points to an organizational form in which widely dispersed individuals co-produce voluntarily and without permission by loosely collaborating through the mediation of digital technologies. In all likelihood, a commons-based alternative to capitalism would also require more formal and stable organizations (“administrations” in the sense I have proposed in chapter 1) in which workers can be employed and engaged durably, meet regularly and physically, as well as use means of production that are expensive enough to be unaffordable by the average individual. Obviously, P2P theory does not deny that since it gives a crucial role to cooperatives (especially open cooperatives). Still, its focalization on CBPP suggests a certain underestimation and suspicion towards stable organizations. In this regard, Dmitry Kleiner’s promotion of “tele-communism” conceived as “communism at a distance” (2010, p. 5) is quite illustrative of an idea that also suffuse P2P theory: the dispersion of individuals and their loose connection through digital networks would be an essential antidote to bureaucratisation. Though not completely baseless, this idea is highly questionable and tends to conflate the meaning of different notions such as “dispersion”, “distribution” and “decentralization” in a way that strangely assimilates democracy to distance. In addition, the focalisation on dispersion is also due to the fact that P2P social and productive relations depends on the distribution of means of production, be they informational or physical. Indeed, P2P theory emerged in the early 2000’s in relation to an apparent trend towards the radical distribution of the means of information and physical production. However, this trend seems much less clear today as we observe the limits of digital fabrication and the rise of platform capitalism. Should alternatives to private and public property only be sought in economic sectors where the required fixed capital is cheap and widely distributed among individuals? Shouldn’t we also try to institute the rail, energy and other large technical systems as commons?

Furthermore, I have argued earlier¹⁶⁶ that the subversive character and emancipatory potential of CBPP has significantly receded in the last decades as the open source movement and

¹⁶⁶ Chapter 2, “Platform capitalism”

platform companies largely managed to integrate it to capitalism. Such a diagnosis sharply contrasts with the optimism of P2P theory though it is anything but original. With the rise of platform capitalism, free software and digital commons do not inspire much fear to major capitalist firms anymore (to say the least) whereas many activists have tempered (and sometimes even lost) their hopes in their ability to protect individual freedoms – not to speak of surpassing capitalism. Yochai Benkler for instance has recognized that “the kind of optimism that typified Barlow’s writing, as well as at least some of my own, is much harder to sustain now that we’ve seen how the successes of the first generation of battles over the commons have turned out” (Benkler 2019a).

In that context, the enormous hopes that P2P theory invests in the gradual rise of CBPP may seem odd. This apparent paradox can be partially explained if we take a closer look at the way P2P theory analyses platform capitalism. It considers “peer production as a social advancement within capitalism but with various post-capitalistic aspects in need of protection, enforcement, stimulation and connection with progressive social movements” (Kostakis et Bauwens 2014, viii). Again, peer production includes both CBPP and platform capitalism. Although P2P theorists harshly criticize netarchical capitalism, it seems that the progressivism of the Marxist narrative leads them to consider it as a “social advancement” in that it would be a step towards the final maturation and autonomization of CBPP. Indeed, netarchical platforms would not be fully P2P but still encourage P2P social dynamics and facilitate autonomous forms of production and exchange: “Paradoxically, capitalism itself strengthens non-capitalist and post-capitalist forms of self-organization and value creation” (Bauwens, Kostakis, et Pazaitis 2019, p. 38). In line with Marx, capital creates the condition for its surpassing. Against him and in line with post-operaism, capital does not do so through its control of the productive process but through the regression of this control: the rise of platform capitalism would signal a regression of capitalist control and an autonomization of cognitive production. Here, P2P theory may highly overestimate the autonomy of peer producers on capitalist platforms. A central aim of capitalist platforms is the prediction and manipulation of human behaviours for profit (Zuboff 2015). User interactions and peer production processes occurring on such platforms are not really autonomous and spontaneous since they are systematically nudged and biased by the platform’s design. Marx’s hope that the capitalist socialisation of labour would create the conditions for the free cooperation of associated workers was historically disproven: it simply reinforced the control of capital and managers over the workforce while durably inscribing it in the materiality of industrial technology. Similarly, I see no reason to believe that the capitalist mediation of user interactions will create the conditions for the free association of peer producers: it simply tends to reinforce capitalist control over users and their activities.

In regard to the cooperative economy, I consider Benoit Borrits’ diagnosis is overall correct: “After almost two centuries, the history of the cooperative movement teaches us that there is no point in expecting any transformative prospect from it” (2018). Years of research on cooperatives led him to the conclusion that, in spite of some significant successes and many interesting experiments, the cooperative movement has become too “institutionalised” to represent a transformative force. Cooperatives can be owned and governed by their workers, their users (or customers) or, more rarely, a combination of stakeholders (e.g., workers, users, associations, local authorities, activists and volunteers). Worker cooperatives and user

cooperatives have different merits and limits. User cooperatives are better-suited to produce for use and to escape from the market competition which worker cooperatives still face (Luxemburg 1900). However, they subordinate workers to the power of associated users who have an interest in low prices. They have developed much more than worker cooperatives: among the 250 million employees working in a cooperative around the world today, only 4 million are employed by a worker cooperative (Borrits 2018, p. 23). The problem is that the vast majority of large user cooperatives eventually experience a form of bureaucratic degeneration: managers take control of the firm, co-opt their successors, and aim for the expansion and growth of the firm, while the voices and interests of users are put on the back burner. Since users are less committed to their cooperative and its daily governance than workers, internal democracy is always more fragile within user cooperatives and tends to become less and less substantial as the organization grows. The P2P Foundation's proposals for the development of "open cooperatives" attempt to address some of these well-known issues. They are constructive, stimulating, and also have some acquaintances with Benoit Borrits' prescriptions. The generalisation of reciprocal licenses favouring a synergy between CBPP and cooperatives is also a promising lead which could revitalise the cooperative movement and deserves strong support. Still, more than ten years after Dmitry Kleiner (2010) came up with the idea of the peer production license, we have to acknowledge that it has not (yet?) been the point of departure of a powerful counter-hegemonic economy. Platform capitalism has become hegemonic while a few platform cooperatives try to emerge at the margins of the digital economy, among which only a handful use reciprocal licenses (e.g., Coopcycle)¹⁶⁷. New forms of cooperatives developing alliances with peer producers could gain in importance in the coming years, but it is extremely unlikely that they eventually turn hegemonic and surpass the capitalist mode of production.

A central limit of P2P theory is its gamble on the gradual development of CBPP and commons-oriented entrepreneurial coalitions *alongside* the conventional, capitalist economy. It proposes to create open cooperatives alongside capitalist enterprises, which would beat them at their own game while also aiming to internalize negative externalities and pursue social/environmental objectives. This gesture is very different from *taking over* capitalist property to transform capitalist enterprises into a form of productive commons. In the first case, capitalist property remains untouched as the juridical instrument enabling capital to command and exploit labour. In the second case, capitalist property is (partially or completely) expropriated and/or the juridical rules underlying its domination over labour are substantially changed. For instance, Thomas Piketty's proposal of "social property" (2019) consists in changing the rules of capitalist property: workers' representatives would have half of the votes within the board of directors and the main shareholders would have their votes capped to avoid too much power concentration. This proposal has many shortcomings and would not surpass capitalism – enterprises would still produce for profit regardless of negative externalities within a system that remains geared towards unlimited economic growth – but it would greatly enhance

¹⁶⁷CoopCycle is a federation of bike delivery co-ops. Governed democratically by coops, it enables them to stand united and to reduce their costs thanks to resources pooling. It creates a strong bargaining power to protect the bikers' rights.

<https://coopcycle.org/en/>

workers' power *throughout* the economy, rather than only in some cooperatives. In many ways, the P2P approach inherits from the late Gorz's call to progressively develop the sphere of autonomy and reduce the sphere of heteronomy. It promotes an *exit from* the capitalist technosystem through the construction of a counter-hegemonic, commons-based technosystem founded upon digital technologies, horizontal organisations, and socially-embedded markets. But can capitalism really be challenged without being more directly expropriated?

Finally, a major issue regarding the P2P version of the Marxist historical narrative is the way it articulates gradual change (reformism) with the perspective of a revolution. P2P theory insists that "revolutions occur as a result of previous structural changes, not as a prior condition to them" (Bauwens, Kostakis, et Pazaitis 2019, p. 54). Based on that, it seems to suggest that what matters today is the gradual development of a new mode of production which will eventually be mature enough to provide the objective conditions for a revolution. P2P theory does not reject the idea of a revolution but seems to delay it in a distant future and focus political energies on gradual changes. This is why I chose to describe it as reformist. Such an approach has the advantage to allow for the formulation of various practical ideas that may be applied directly by various actors (e.g., civil society members, economic agents, political parties) and gather them around a positive project of post-capitalist transition, rather than simply waiting for the uncertain surge of a revolution. Further, it is true that everything that prepares the future society within the old can only facilitate the tasks of a revolution. Yet, this approach risks discouraging revolutionary action in the here and now on the pretext of a very uncertain gradual maturation of an alleged new mode of production. Historical change in general and revolutions in particular cannot be reduced to the reproduction of a simple scheme, to the political outcome of an economic process consisting in the progressive rise of a new mode of production and its associated social class. A revolution is always an unpredictable event which expresses the creativity of the social-historical and is not related to existing conditions in a strictly causal manner. It is conditioned by previous structural changes but does not simply express them; it creates new conditions through an explicit activity of self-institution. The idea that the socialist revolution should wait for the realization of some objective economic conditions probably was audible when Kautsky formulated it against Lenin in 1917, in a country where industrialisation had barely started and in a time when the belief in the scientific character of Marxism was strong. It cannot be convincing today in a context where capitalism has developed the productive forces so much that they threaten the ecological conditions of human civilisation, and because:

"We no longer believe in the narrative of the inexorable emancipation of humanity, which presupposes and even justifies all manner of slow births and difficult deliveries." (Dardot et Laval 2015, p. 69).

Therefore, the important question regarding the revolution is not whether or not it is too early or too late for it, but whether or not we want it – here and now.

The revolutionary perspective: Michael Hardt & Antonio Negri

Michael Hardt and Antonio Negri have developed one of today's most famous critical theory in a tetralogy composed of *Empire* (2000), *Multitude* (2004), *Commonwealth* (2009), and *Assembly* (2017). They are neo-Marxist philosophers and central figures of post-operaism. Our analysis cannot address every aspect of their imposing theoretical work in a few pages. It will mainly focus on the concept of common, its relation to the post-operaist analysis of cognitive capitalism and to the prospect of a post-capitalist future. Hardt and Negri were the first theorists to propose a conceptual shift from *the commons* in the plural to *the common* in the singular. Their critique "aims at not a return to the past or creation of a future *ex nihilo* but rather a process of metamorphosis, creating a new society within the shell of the old" (Hardt et Negri 2009, p. 8). On the one hand, they choose to promote the notion of the common rather than the commons, since the valorisation of a precapitalist economic institution could appear as a return to the past which conflicted with their Marxist progressivism. On the other hand, they strive to remain loyal to the Marxist idea that capitalist development creates the conditions of the mode of production and the society that will eventually succeed to it, hence to a methodology aiming to identify in current economic trends the germs of the future society.

The commentary of Marx's *Grundrisse* (1857) and especially of the "Fragment on machines" has been central to the tradition of operaism and post-operaism. Antonio Negri developed an in-depth analysis of this book in a series of seminars dating from 1978. He famously interpreted the *Grundrisse*, not as a step towards *Capital*, an inferior and preparatory manuscript, but as another masterpiece, containing alternative analyses and intuitions, which would be both less deterministic (or objectivist¹⁶⁸ he would say) and more fit to describe the latest transformations of capitalism. In the "Fragment on machines", Marx indeed presents an understanding of the contradiction between the productive forces and the relations of production which singularly differs from the one exposed in *Capital*. He starts by describing how the subsumption of labour under capital becomes real as the knowledge involved in production gets incorporated in fixed capital, in the form of an "automatic system of machinery" controlling and directing the workers activity from outside¹⁶⁹. As industry develops, Marx forecasts that the creation of wealth (in terms of use-value) will depend less and less on the time of labour directly employed in production and more and more on the general level of technoscientific knowledge, on the *general intellect* which is incorporated to fixed capital. As general social knowledge becomes the main factor of production, the law of value enters in crisis since wealth creation cannot be measured by labour time anymore:

"The theft of alien labour time, on which the present wealth is based, appears a miserable foundation in face of this new one, created by large-scale industry itself. As soon as labour in the direct form has ceased to be the great well-spring of wealth, labour

¹⁶⁸ Operaism has insisted on the primacy of "subjective" factors of historical development, such as class struggles, over "objective" ones, such as objective economic or technological laws which would guide a necessary historical path.

¹⁶⁹ "The science which compels the inanimate limbs of the machinery, by their construction, to act purposefully, as an automaton, does not exist in the worker's consciousness, but rather acts upon him through the machine as an alien power, as the power of the machine itself" (Marx 1857).

time ceases and must cease to be its measure, and hence exchange value [must cease to be the measure] of use value.” (Marx 1857)

Furthermore, capital constantly increases labour productivity; it economises labour and thus raises potential leisure time. However, it constantly transforms this time saved by technical progress into surplus labour¹⁷⁰ instead of reducing working time.

“Capital itself is the moving contradiction, [in] that it presses to reduce labour time to a minimum, while it posits labour time, on the other side, as sole measure and source of wealth. [...] On the one side, then, it calls to life all the powers of science and of nature, as of social combination and of social intercourse, in order to make the creation of wealth independent (relatively) of the labour time employed on it. On the other side, it wants to use labour time as the measuring rod for the giant social forces thereby created, and to confine them within the limits required to maintain the already created value as value.” (ibid)

On the one hand, the development of productive forces in the form of industrial machinery eventually inhibits the functioning of the law of value upon which the capitalist mode of production is founded. On the other hand, by converting in surplus labour the time saved by technology, the capitalist mode of production eventually fetters the development of the productive forces of every individuals (their skills, knowledge, capabilities) and thus of the general intellect. Workers thus have to take back control over this liberated time:

“For real wealth is the developed productive power of all individuals. The measure of wealth is then not any longer, in any way, labour time, but rather disposable time.” (ibid)

According to its Negrist and post-operaist interpretation, this text would thus suggest that the main force of production in late capitalism would be knowledge developed in society at large and beyond capitalist command. The knowledge incorporated in fixed capital to command a decreasing amount of industrial labour, would result from spontaneous social collaboration¹⁷¹. Immaterial labour becomes the main force of production and contradicts capitalist relations of production¹⁷².

In that context, what does the common refer to? Hardt and Negri’s notion of the common comprises heterogeneous meanings that render the unity of the concept questionable (Dardot et Laval 2015, p. 195). First, it refers to “the common wealth of the material world—the air, the

¹⁷⁰The *necessary labour time* is the time (per day or per week) which workers must work (in the average conditions of the industry of their day), to produce the equivalent of their own livelihood (at the socially and historically determined standard of living of their day).

As wage-workers however, they cannot get paid until they have completed a full working day, and that extra time they work, over and above the necessary labour time, is called *surplus labour time*. (Marxists.org s. d.)

¹⁷¹ The Negrist interpretation of the *Grundrisse* is contested by various specialists. Dardot and Laval (2015) for instance consider that Marx does not explicitly present the technoscientific knowledge that would eventually become the main factor of production as produced by spontaneous social collaboration. In their view, Marx considers that this knowledge is produced by capital itself, by private R&D. They also insist that the industrial labour described in the “Fragment on machines” is really subsumed by capital. Moreover, their exist multiple views on the way to articulate the Marx of *Capital* and the Marx of the *Grundrisse*: are these two compatible or contradictory? Did Marx change his mind? etc. See for instance Caffentzis (2013).

¹⁷² See Chapter 2, « Cognitive capitalism ».

water, the fruits of the soil, and all nature's bounty—which in classic European political texts is often claimed to be the inheritance of humanity as a whole, to be shared together” (Hardt et Negri 2009, p. viii). In that respect, it inherits from a theological perspective on nature as a gift from God to be shared by everyone in common. Second, the common is “also and more significantly those results of social production that are necessary for social interaction and further production, such as knowledges, languages, codes, information, affects, and so forth” (ibid, p. viii). The common here appears as a social ontology, it is the matter of the social itself, the condition and result of human activity, the production of common experiences, habits, and institutions through social interaction. However, the ontology of the common does not separate and oppose nature and society but insists on their interactions, be they positive or negative, generative or extractive. Following Spinoza, it refuses to set man apart from nature and its deterministic laws (Hardt et Negri 2000, p. 91). Beyond the universal character of nature and social life, the common points to a central dimension of today's economy. In the age of cognitive capitalism, production has become biopolitical: subjects mostly produce subjectivity and forms of life through their interactions, rather than material objects. Immaterial labour consists in the manipulation of symbols and affects, it produces the common based on the common itself. The common thus appears as a new mode of production which emerges within capitalism and may surpass it.

The common would be central to today's economic life but hidden to us by our habit of seeing the world as divided between the public and the private. Economists increasingly recognize the economic importance of “externalities” but this remains very insufficient. The common cannot be simply approached in terms of externalities: it has become the heart of biopolitical production. The alternative between the private and the public corresponds to the one between capitalism and socialism. Michael Hardt and Antonio Negri invite us to reject both terms of the alternative. Capitalism and socialism are both based on property and top-down control over the multitude, while the common exceeds property¹⁷³ and is fettered by hierarchical control. The public/private alternative is misleading in so far as socialism is not the contrary of capitalism: “socialism is a regime for the state management of capitalism” (Hardt et Negri 2009, p. 268). The two philosophers have a plain preference for the concept of communism: “what the private is to capitalism and what the public is to socialism, the common is to communism” (ibid, p. 273). However, the common should not be thought of as the third pole of a triangular system since it “exists on a different plane from the private and the public, and is fundamentally autonomous from both” (ibid, p. 282).

To be efficient, immaterial labour requires a great degree of autonomy and a free access to the common (to pre-existing information, knowledge and culture). The exercise of capitalist control increasingly fetters the productivity of immaterial labour, while its products tend to become common and resist private appropriation. The freedom of biopolitical labour is not individualist since “the common can only be produced socially, through communication and cooperation, by a multitude of singularities” (ibid, p. 303). It is not collectivist either since these singularities are not unified in a homogeneous whole. Economic freedom does not reside in the private which would stand opposed to public control; economic freedom and innovation rather reside in the

¹⁷³ Hardt and Negri conceive the common as non-property rather than common property.

common which stands against private control, anchored in private property. Furthermore, the dynamic between singularities and the common radically differs from the dialectic between the many and the one: “Whereas the one stands opposed to the many, the common is compatible with and even internally composed of multiplicities” (ibid, p. 184). Hardt and Negri’s ontology thus values the productive play of differences and composition of singularities within the common, while it rejects homogeneity and identity as sterile and conducive to institutions that would corrupt the common such as the family, the corporation, or the nation.

Michael Hardt and Antonio Negri argue that capitalist accumulation is becoming increasingly external to the productive process and based on the expropriation of the common. The expropriation of the common first appears through the importance taken by accumulation by dispossession under the influence of neoliberalism: the common wealth is being privatised. The expropriation of the common also appears through the parasitic form taken by exploitation under cognitive capitalism. Capital has come to subsume society as a whole rather than just labour, but this subsumption is formal rather than real since social production is autonomous. Illustrative of this change is the centrality of the metropolis under cognitive capitalism, which Hardt and Negri compare to the centrality of the factory under industrial capitalism (ibid, p. 249). In Italian, “*il commune*” means both “the city” and “the common”. Today’s struggles, they remark, usually block cities rather than factories. And while factories generated profit, cities generate rent. The extent to which positive and negative externalities (e.g., air pollution, noise, criminality, cultural dynamism, quality of social relations) shape real estate prices also reflects the economic importance of the common.

The increasing autonomy of immaterial labour does not mean that capitalism is *necessarily* condemned. It represents an opportunity for social emancipation which can only be seized through political action. The latter takes the form of an *exit from* capitalist control and the autonomous organization of the multitude: “class struggle in the biopolitical context takes the form of exodus” (ibid, p. 152). This exodus is defined as a “process of *subtraction* from the relationship with capital by means of actualizing the potential autonomy of labour-power” (ibid, p. 152). In many respects, it closely resembles the strategic vision of P2P theory (which it significantly inspired). Like in P2P theory, the construction of a counter-hegemonic economy requires a combination of horizontal organizations, information and communication technologies, and socially-embedded markets. Hardt and Negri also call for the rise of “an entrepreneurship of the common” (ibid, p. 306) and suggest that the power of money and finance could serve freedom in the hands of the multitude (ibid, p. 295).

However, their understanding of class struggle as an exodus is explicitly revolutionary. To their readers who have a “taste for combat” they remind that: “Moses learned long ago that those in power do not just let you go without a fight” (ibid, p. 164). They also affirm that the multitude should not leave “penniless and barefoot” but “reappropriat[e] the common – the results of our past labours and means of autonomous production and reproduction for our future” (ibid, p. 164). “That is the field of battle”, they conclude. This paragraph appears rather curious though: the “field of battle” would be the reappropriation of the means of production, the expropriation of capitalist property. But what is an exodus if not the exact opposite: escaping capital by building elsewhere. This passage suggests that Hardt and Negri encourage the expropriation of

capitalist property (which they identify as the field of battle), but it is the sole allusion to such an endeavour in a 500-pages long book of communist political theory in which the exodus is the main watchword.

Still, Hardt and Negri's theory of the common clearly calls for revolutionary action in the here and now. Antonio Negri has remained a revolutionary Marxist since the 1960's: in his view, libertarian communism was possible in the industrial age as it is possible today. The new sociotechnical context simply changes the form of the revolutionary subject (the multitude rather than the industrial proletariat), of the class struggles (the exodus rather than factory-based struggles), and the perspectives of emancipation (the communism of the common and democracy of the multitude rather than industrial worker's self-management). Hardt and Negri's conception of the revolution is radically libertarian. The multitude regards the state as the seat of domination rather than the realm of freedom and "wants to lay its hands on state apparatuses only to dismantle them" (p. 355). It seeks to replace the transcendent and constituted power of the state by new political institutions that express its immanent and constituent power. Hardt and Negri consider the new forms of governmentalities that emerged with neoliberal globalisation (*Empire*) as a source of inspiration for the creation of such institutions. Rather than clinging to the sovereignty of the nation-state, they propose to subvert the notion of governance to reformulate it as a democratic concept. Beyond their call for revolutionary action, they also advance a series of revolutionary reforms that strikingly resemble the ones advocated by P2P theorists: a universal basic income, processes of participatory democracy, and an equal access to infrastructures (e.g., basic sanitary conditions and material security, education and research, open information and communication infrastructures) supporting biopolitical production. However, these reforms are not presented as necessary steps in the progressive development of a mode of production preparing the advent of a revolution in a distant future, but as possible mid-term objectives if such a revolution does not surge immediately.

In last sub-section, I have pointed out some limits of the Marxist historical narrative (especially regarding the analogy between the transition from feudalism to capitalism and from capitalism to post-capitalism) and raised doubts regarding the emancipatory potential of CBPP and its ability to erode the foundations of capitalism. A large part of these critiques can also apply to the revolutionary political theory of Michael Hardt and Antonio Negri. In chapter 2, I have also argued against post-operatism that capital still organizes the productive cooperation of the biopolitical workforce, that capitalist control over labour has not regressed to formal subsumption but progressed towards subjective subsumption. The development of immaterial labour does not fundamentally contradict capitalist relations of production, it simply forced them to re-adapt and develop new managerial practices. In addition, we saw that for Marx, the objective foundation of communism is to be found in the capitalist organization of the productive process, rather than in the increasing autonomy of workers from capitalist control. In that context, Dardot and Laval rightly argued that the transition model envisioned by post-operatism (and P2P theory we may add) represents a singular combination of Marxism and Proudhonism: "while capital is essentially parasitic, it nonetheless remains the 'creator' of the conditions necessary for communism" (2015, p. 204). Based on a very specific (and contested) interpretation of the *Grundrisse*, Michael Hardt and Antonio Negri present Marx as a visionary

anticipator of the autonomy of immaterial labour. However, the idea that capitalist exploitation takes the form of a theft over a spontaneous social force rather reproduces the vision developed by Proudhon. Hardt and Negri combine this vision with diverse elements of the Marxist theory of history such as its progressivism and historical optimism or its insistence on the contradictions between the development of productive forces and relations of production. According to Dardot and Laval, we ought to overcome both the Marxist and the Proudhonian models: we should neither postulate that the common will be produced by capital, nor that it spontaneously emerges from social life. Rather, we should observe empirically the way struggles and collective practices give shape to the common, and theoretically highlight that such practices are not mere resistances but that they create social institutions and a certain form of law.

In spite of all that it integrates from the Marxist theory of history, its optimistic diagnosis of the contradictions of contemporary capitalism and the emancipatory opportunities they open, the theoretical work of Michael Hardt and Antonio Negri cannot be described as techno-deterministic¹⁷⁴ (debate A). For them, a radically democratic surpassing of capitalism was possible before the advent of digital technologies. More importantly, their whole social theory is based on the operaist methodological premise that the main engine of historical and capitalist development resides in the subjectivity of class struggles rather than in objective economic or technological laws (Tronti 1966). Neoliberal globalisation and cognitive capitalism do not represent the necessary result of capital's objective contradictions, they essentially result from the capitalist response to the new social aspirations that were expressed in the class struggles of the 1960's:

“The history of capitalist forms is always necessarily a reactive history: left to its own devices capital would never abandon a regime of profit. In other terms, capitalism undergoes systemic transformation only when it is forced to and when its current regime is no longer tenable. [...] The power of the proletariat imposes limits on capital and not only determines the crisis but also dictates the terms and nature of the transformation. The proletariat actually invents the social and productive forms that capital will be forced to adopt in the future” (Hardt et Negri 2000, p. 268).

Regarding debate (B), Hardt and Negri are clearly antitechnocratic in that they forcefully criticize any form of social hierarchy, including those legitimated by reference to technoscientific expertise¹⁷⁵. Their philosophy comprises a rather complex epistemology which is strongly influenced by postmodernism but avoids epistemic relativism and recognizes that the notion of “truth” has emancipatory virtues, in some contexts at least: “In the context of state terror and mystification, clinging to the primacy of the concept of truth can be a powerful and

¹⁷⁴ It is true that at a deeper ontological level their philosophy is deterministic in the sense of Spinoza. However, the debate over Spinoza's deterministic philosophy largely exceeds our concern here. As long as technological and economic factors do not autonomously determine historical evolution according to Hardt and Negri, their theory can be described as constructivist.

¹⁷⁵ See for instance *Commonwealth* (2009) p. 304: “Production is also restricted when differences configure hierarchies and, for instance, only ‘experts’ speak and others listen. In the biopolitical domain the production of the common is more efficient the more people participate freely, with their different talents and abilities, in the productive network”.

necessary form of resistance” (ibid, p. 155). They also reject the potentially technocratic implications of the Marxist theory of history¹⁷⁶ by insisting that “there is no place for vanguards” while the “intellectual is and can only be a militant, engaged as a singularity among others, embarked on the project of co-research aimed at making the multitude” (ibid, p. 118).

Regarding debate (C), Hardt and Negri’s political theory is significantly technophile. To my knowledge, nowhere in their works can a critique of technological expansion be found. They criticize the way capital and power shape technology to control and exploit the multitude, but always call for the re-appropriation and *internal* transformation of technological means rather than their *external* limitation. They discuss at multiple occasions the way we should understand the relations between nature, humans, and technological artefacts but the systematic destruction of the natural environment which accompanies capitalist development is not a central theme of their work. Based on Spinoza, they argue that we should break down the conceptual barriers’ humanism has posed between men, animals and machines since all of these biological or technological creatures are subject to deterministic laws (ibid, p. 91-92). Such break down would enable more harmonious and peaceful interactions between them by attacking the modern anthropocentrism which legitimates the domination of man over nature. No need to enter here into the complex philosophical debate regarding the (ir)relevance of humanism in an epoch of ecological collapse. There are serious philosophical arguments in favour of the removal of the barrier between man and nature – less so (in my opinion) in favour of the removal of the barrier between technology and the living. In any case, it seems that in Hardt and Negri’s philosophy, the removal of frontiers between man/human/machine does not so much encourage to limit the technological manipulation of nature than opens towards its radical furthering. This is well-illustrated by their promotion of post-humanism and of the cyborg as a figure of liberation¹⁷⁷.

Finally, I believe that Hardt and Negri’s political theory does not sufficiently break with one of the main problem of Marx’s theory of history: its productivism. Whereas P2P theory attempts to avoid the productivist implications of the Marxist historical narrative, Hardt and Negri explicitly associate social emancipation to the endless development of productive forces. Rather than criticizing capitalism for being the only mode of production which needs to constantly increase production, the two philosophers condemn it for fettering the productive forces. After having formulated an interesting critique of the “developmentalist ideology” (Hardt et Negri 2009, p. 90) which characterized socialist and capitalist states in the twentieth century, they end up arguing that economic development and growth should not be abandoned but reconceptualized as “a process of social composition, increasing our general social powers” opposed to recession understood as “social decomposition, in the sense that certain poisons decompose a body” (ibid, p. 284-285). It is clear that such economic growth is not meant to be measured by GDP. Still, I believe this rhetoric is misplaced and obscures both our understanding of what capitalism is and of what socialism should be. The material and energy

¹⁷⁶ See Chapter 1, “Karl Marx and Technological Determinism”.

¹⁷⁷ See for instance this quotation:

“The cyborg is now the only model available for theorizing subjectivity. Bodies without organs, humans without qualities, cyborgs: these are the subjective figures produced and producing on the contemporary horizon, the subjective figures today capable of communism.” (Hardt et Negri 1994)

consumption of wealthy nations is not sustainable and needs to degrow. Degrowth in the material and energy throughput is incompatible with GDP growth and is likely to reduce GDP (Kallis 2019). It is thus incompatible with capitalist illimitation but can be achieved in a socialist economy dedicated to the production of democratically determined use values. The promotion of the concept of “economic growth” – even deeply redefined – cannot but obscure this vital aim of material and energetic sobriety which should be central to 21st century socialism. As the economist and degrowth theorist Giorgos Kallis puts it:

“In any meaningful understanding of the term, ‘economic growth’ signals an increase of material standards. An increase in material living standards will require, well, more materials. This is independent of whether the economy at stake is capitalist, socialist, anarchist or primitive.” (Kallis 2019)

Furthermore, the concepts of productivity and growth are unfit to describe improvements in health, education, social relations and culture. Even economists as close to the authors of *Commonwealth* as Carlo Vercellone and Alfonso Giuliani remark that “in the context of the production of humans for and by humans, efficiency is primarily qualitative and the very concept of productivity loses its relevance” (2019). The way Hardt and Negri insist on the “productivity of biopolitical labour” is rather confusing in that the notion of productivity is a quantitative metric, a ratio between production inputs (capital, labour, raw materials) and outputs which calls for maximization. The problem we are facing today is not so much that capital fetters the rise of social productivity, but that it mistreats society by forcing the quantitative metric of productivity to rule the provision of health, education, research, culture and care. Such core sectors of biopolitical production are better conceived and organized beyond the industrial and capitalist obsession for productivity. They do not represent the historical summit of the development of productive forces, coming on top of two centuries of growth in labour productivity to push further in the same direction. They are actually the most stagnant sectors, those in which growth in labour productivity has been the slowest (when it could even occur) because it is generally counter-productive¹⁷⁸. Multiple economists argue that their centrality in the economy of wealthy nations is partially responsible for secular stagnation, that is the slowing down of economic growth which occurred in the digital age (Baumol 1967; Jackson 2009; Nordhaus 2006). Definitely, they hardly fit with the productivism that suffuses the theory of history elaborated by Marx in the industrial age.

¹⁷⁸ Tim Jackson argues that care, culture, and handicrafts resist the logic of productivity growth and should thus be the core sectors of a post-growth economy:

“Pressurising nurses, doctors, teachers and care workers turns out to be counterproductive in all sorts of ways. [...] Something similar happens in handicraft. It’s the accuracy and detail inherent in crafted goods that endows them with lasting value. It’s the attention paid by the carpenter, the potter, the seamstress or the tailor which makes this detail possible. [...] A parallel phenomenon occurs in the creative industries. [...] Indeed, artistic endeavours generally tend to resist the logic of labour productivity because their vital ingredient is the time and skill of the artist. Nothing much is to be gained – and much would be lost – by asking the New York Philharmonic to play Beethoven’s 9th Symphony faster and faster each year.” (Jackson 2009, p. 184)

The techno-determinist perspective: Jeremy Rifkin

Jeremy Rifkin is a very famous economic and social theorist as well as an influent political advisor. As the founder and president of the Foundation on Economic Trends (FOET) and of the TIR (Third Industrial Revolution) consulting group, he has been advising the leadership of the European Union since 2000 (e.g., four different presidents of the European Commission, various heads of states including Angela Merkel) and more recently, the government of China. Since 1995, he has been teaching a course on techno-economic trends and sustainability attended by numerous CEOs and senior managers at the University of Pennsylvania. He frequently speaks before business, government and civil society forums. Among the numerous international bestsellers that he wrote, the one which will hold our attention here has been published in 2014 and entitled “*The zero marginal cost society: the internet of things, the collaborative commons, and the eclipse of capitalism*”. In this book, Jeremy Rifkin contends that current economic and technological trends will necessarily lead to the decline of capitalism and the concomitant rise of the commons which, he believes, should come to dominate the economy by 2050. Rifkin’s argument has many acquaintances with the other theories of the common(s) as a mode of production. However, his thesis is the most strongly techno-deterministic (debate A), the most technophile (C), and is quite technocratic (B) as well, which makes it the most problematic in my opinion.

At the very beginning of his book, Jeremy Rifkin displays his central claim as follows:

“Ironically, capitalism’s decline is not coming at the hands of hostile forces. There are no hordes at the front gates ready to tear down the walls of the capitalist edifice. Quite the contrary. What’s undermining the capitalist system is the dramatic success of the very operating assumptions that govern it. At the heart of capitalism there lies a contradiction in the driving mechanism that has propelled it ever upward to commanding heights, but now is speeding it to its death” (Rifkin 2014, p. 8).

The core contradiction of capitalism identified by Jeremy Rifkin is not exactly assimilable to any of those identified by Karl Marx in the *Grundrisse* or in *Capital*. Yet, it closely resembles them in so far as it is also tied to the development of productivity resulting from technological progress. Market competition force firms to rationalize their production process and invest in new production technologies (fixed capital) so as to produce as efficiently as possible. This dynamic constantly stimulates the rise of productivity and drives the marginal production costs down. The logical conclusion of capitalist development thus appears to be an era of extreme productivity in which the marginal production costs approach zero in every economic sector. In principle, near zero marginal production costs lead to nearly free products and near zero profits.

Rifkin argues that this phenomenon has already “wreaked havoc” (ibid, p. 9) in the economic sectors selling information-intensive goods (e.g., music, film, edition, software), since people can reproduce and share such goods for free on the web as well as create their own amateur content as digital prosumers. It seems that he did not realise that the number of subscribers to product platforms such as Netflix or Spotify were skyrocketing as he was writing, generating a new profitable business model for cultural industries. Nonetheless, he confidently asserts that

“the zero marginal cost revolution is beginning to affect other commercial sectors, including renewable energy, 3D printing in manufacturing, and online higher education” (ibid, p. 9). Prosumers will soon be able to produce green energy (especially solar and wind energy) for nearly free and share their surplus within global networks, he claims. Manufacturing will be revolutionized by 3D printers which will empower prosumers, enabling them to self-produce quasi-gratuitously almost everything or buy the most complex products to local social businesses. Higher education will become accessible to all for free with the development of massive open online courses (MOOC). As most of the goods and services will become nearly free, the opportunities for profit-making will become increasingly scarce. Some capitalist enterprises will keep on surviving at the margins, but the market sphere will be drastically reduced. In short, the most advanced capitalist technology will create an age of post-capitalist abundance.

This argument presents an extremely naïve version of the Marxist historical narrative which has completely evacuated the importance of class struggles. Here again, capitalists unwillingly play their progressive role and pave the way to socialism by developing the forces of production: “Although economists and entrepreneurs never intended for the capitalist system to self-destruct (they expected it to reign forever), a careful look at its operating logic reveals the inevitability of a future of near zero marginal cost” (Rifkin 2014). However, according to Marx (the Marx of *Capital*), the tendency of the profit rate to fall would lead to increasingly brutal economic crises, until an ultimate crisis would constitute the point of departure of a socialist revolution. To the contrary, Rifkin conceives the “eclipse of capitalism” as a progressive and evolutionary process in which commons would smoothly come to replace the capitalist market because of their superior efficiency and better adaptation to an age of abundance.

Rifkin contends that the central contradiction of capitalism is about to be exacerbated by a new technology platform – the Internet of Things (IoT) – which will launch a third industrial revolution. The notion of technology platform is crucial to Rifkin’s techno-determinist social theory:

“Throughout history, great economic transformations occurred when human beings discovered new energy regimes and created new communication media to organize them. The convergence of energy regimes and communications media establishes a new matrix for reorienting the temporal-spatial dynamic, allowing larger numbers of people to come together and cohere in more complex, interdependent social organizations. The accompanying technology platforms constitute the infrastructure but also dictate the way the economy is organized and managed.” (Rifkin 2014, p. 24)

The technology platforms that founded the first and second industrial revolutions intrinsically required vertically integrated firms¹⁷⁹. Rifkin thus adopts a substantivist perspective regarding

¹⁷⁹ “This unprecedented—and unimaginable—concentration of economic power was not just happenstance or a byproduct of man’s insatiable avarice. Nor can it be rationalized away by simply blaming deregulation or finding fault with political ineptitude or, worse still, political collusion and enablement—although these were all contributing factors to its growth. Rather, on a more fundamental level, it flowed inexorably from the communication/energy matrices that were the foundation of the First and Second Industrial Revolutions. Like it or not, giant, vertically integrated corporate enterprises were the most efficient means of organizing the production and distribution of mass produced goods and services” (Rifkin 2014).

the first and second industrial revolutions: technology was biased towards social domination. It inexorably led to an unprecedented concentration of economic power and a bureaucratic organisation of production, whether the economy was capitalist or socialist. Fortunately, Jeremy Rifkin assures us there is no need to worry since technology has now autonomously become liberatory and democratic. Indeed, the technology platform of the third industrial revolution, the IoT is “the technological ‘soul mate’ of an emerging Collaborative Commons” (ibid, p. 21).

“The new infrastructure is configured to be distributed in nature in order to facilitate collaboration and the search for synergies, making it an ideal technological framework for advancing the social economy. The operating logic of the IoT is to optimize lateral peer production, universal access, and inclusion, the same sensibilities that are critical to the nurturing and creation of social capital in the civil society. The very purpose of the new technology platform is to encourage a sharing culture, which is what the Commons is all about” (Rifkin 2014, p. 21)

Who will provide civil society with such a marvellous infrastructure? Rifkin tells us that General Electric, Cisco, IBM, and Siemens are all investing in the development of this smart technology platform that will connect everything and everyone. He also tells us that he is regularly invited by some of these companies to speak in front of their CEO’s and board of directors (ibid, p. 17-19). Still, no need to worry again, since the IoT that these companies are building is “designed to be open, distributed and collaborative” (ibid, p. 17). If Jeremy Rifkin (their consultant) says so, it must be true. Throughout the book, Rifkin sometimes tempers his techno-determinist thesis and recognizes that there is a struggle between governments, capitalist enterprises and civil society to define the shape of the new infrastructure (especially in chapter 12)¹⁸⁰. He even writes somewhere that “it would be a mistake to believe that a Commons model will invariably govern the next chapter in the human journey” (ibid, p. 153). He seems to consider that large capitalist firms can help governments to build the IoT, but that the infrastructure should be public and accessible to every citizen and companies. Still, he constantly reasserts that the IoT will necessarily be public, decentralized, and sound the death knell of capitalism. I think it would be vain to search for any consistent equilibrium between the strong techno-determinism constituting the core thesis of his book and those vague recognitions of an ongoing struggle. There is none. If we give any credit to the latter, then the whole argument of the book collapses.

The Internet of Things would combine the existing Communications Internet with an emerging Energy Internet and an emerging Logistics Internet. Such technology platform would allow billions of prosumers throughout the world to exchange energy, goods and services at near zero marginal costs. It would be fed by the Big Data generated by billions of sensors fixed to production lines, logistic networks, shops, buildings, natural resources, vehicles and even human beings. Rifkin presents it as a single, global, and smart infrastructure embedding all society, nature and artefacts, extracting data from every action and interaction occurring

¹⁸⁰ “The struggle over governance of the three interlocking Internets that make up the Internet of Things is being aggressively waged among governments, capitalist enterprises, and champions of the nascent social economy on the Commons, each with ambitions to define the coming era” (Rifkin 2014, p. 156).

anywhere, so as to optimize the efficiency and productivity of all sorts of social, natural and technical processes. There is clearly a tension or an ambiguity between Rifkin's promotion of the independent prosumer and his promotion of the IoT. On the one hand, he asserts that 3D printers will allow individuals to produce independently rather than having to rely on an industrial mega-machinery, thus realising the dream of such people as Mahatma Gandhi, Ivan Illich or E. F. Schumacher. On the other hand, he promotes the inclusion of everything and everyone within a massive technological system which closely resembles a global automated factory. In many respects, the vision of Jeremy Rifkin seems closer to the dream of Andrew Ure¹⁸¹ than to the one of Gandhi. It is the vision of a perfectly ordered universe, a vast automaton in which men are integrated as mere cogs.

In spite of Rifkin's soothing discourse, the IoT he champions has all the appearance of an infrastructure of surveillance which would complement the existing capitalist platforms. He enthusiastically declares that "the IoT's most dramatic impact thus far has been in security systems" since "offices, factories, stores, and even public gathering places have been outfitted with cameras and sensors to detect criminal activity" (ibid, p. 17). It might not be completely irrelevant to remind that the authoritarian government of China has shown interest in Rifkin's ideas and hired him as an advisor (Bloomberg News 2013; Gardels 2015). In chapter 5, he further develops an argument promoting "transparency" against "privacy". He presents privacy as a value linked to the history of enclosures, the capitalist mode of production and bourgeois lifestyle. He portrays it as a modern taste for intimacy or even prudishness, which would contrast with the fact that "for all of human history, until the modern era, life was lived more or less publicly, as befits the most social species on Earth" (Rifkin 2014, p. 64).

To the contrary, Castoriadis' democratic theory taught us¹⁸² that privacy is not merely a matter of intimacy, but fundamentally, a matter of freedom. The fact that the private sphere of the household (*oikos*) is relatively hidden and protected from the reach of political power (the strictly public sphere, equivalent to the *ecclesia*) and from the reach of powerful enterprises evolving in the socio-economic sphere (equivalent to the *agora*) is a guarantee for individual and collective autonomy. Only democratic regimes properly separate and articulate these different social spheres. They aim to make the public sphere become truly and effectively public by opening it to the participation of all. To this end, it is required to make the public sphere as transparent as possible; democratic decision-making does not take place behind closed doors. However, from a democratic (as well as from a liberal) perspective, there is no legitimate reason for transparency to infringe upon the boundaries of the private sphere and render individual behaviours visible and controllable by political power and capitalist firms. The institutionalisation of such infringement is – to the contrary – a path towards authoritarianism.

Andrew Feenberg developed an interesting argument regarding this topic:

“The technocracy exercises [technical] power under two assumptions that tend to naturalize it—first, that technical progress is on the whole desirable and, second, that it can occur only along the established trajectory of development. Significantly, the

¹⁸¹ Andrew Ure is a famous 19th century engineer and theorist factory organisation. See Chapter 1, “David Noble and the social construction of industrial technology”.

¹⁸² See Chapter 1, “The project of autonomy”, especially the last two paragraphs.

second assumption tends to feed back into the first, defining the norm of progress in terms of technical potential. The most flagrant recent case concerns privacy: since privacy is routinely violated on social networks, we are told that transparency is progressive. The inspiration for this supposed instance of progress is clearly a function of technical developments rather than the reverse.” (Feenberg 2017, p. 194)

Indeed, Rifkin’s discourse perfectly illustrates this argument in that it legitimates the trend towards the erosion of privacy as a technical necessity associated to the progress of the IoT, whose advent would be extremely desirable as it would represent the best and only way to solve current social and environmental problems. Andrew Feenberg’s point also allows us to shed light on the manner in which the technophile (“technical progress is on the whole desirable”) version of techno-determinism (“it can occur only along the established trajectory of development”) systematically reinforces technocratic power. Different critiques of Rifkin have denounced the contradiction between his promotion of lateral power and his use of vertical methods to advance his ideas – his proximity with technical, political, and economic elites which are meant to realise his vision by bringing about the technology platform of the third industrial revolution (Gadrey 2013; Mamère et al. 2014). But if technology is thought to bring salvation and that its progress is unilinear, then any dominant class devoted to technical progress can be trusted to work (even unknowingly) for the good of mankind¹⁸³.

This section has thus presented different theories of the common(s) as a mode of production, discussed their variety and their respective limits. They are all inspired to some extent by the deterministic element in Marxism and consider the common(s) as a new mode of production that develops within capitalism and could surpass it. They recognize that capital has held a progressive role by developing the forces of production, but claim it is now starting to fetter them. They all try to overcome the most problematic aspects of the Marxist theory of history (techno-determinism, technocracy, techno-philia and productivism) but none fully succeed in doing so. The next section will present the theory of the common as a political principle. Building on Castoriadis’ philosophy, this theory of the common values the revolutionary element in Marx and rejects the deterministic one. I claim it is the most adapted to think emancipation in the 21st century.

¹⁸³ Castoriadis exposes this rationale very clearly in an already quoted (see Chapter 1, “Karl Marx and Technological Determinism”) passage:

“It has often been asked how Marxists could have been Stalinists. But if the capitalist bosses are progressive, on the condition that they build factories, how could the commissars who build just as many and even more of them not be so as well?” (Castoriadis 1975, p. 86).

The Common as a political principle

The political principle of the common

In a major work entitled “*Common: On Revolution in the 21st century*”¹⁸⁴ (2015), Pierre Dardot and Christian Laval have theorized the common (“*le commun*” in French) as a political principle which animates contemporary struggles against neoliberalism and could inspire an explicit re-institution of society by itself – a revolution. They attempted to grasp and precise the political principle that underlies the multiplicity of movements, practices and discourses that have been contesting neoliberalism since the 1990’s, often in the name of various understandings of the common(s), so as to feed and enrich these struggles. In their view, what all these struggles and experiments share is a defence of use rights against property and of radical democracy beyond representation.

In their inquiry, Pierre Dardot and Christian Laval rapidly come to face a fundamental question of political theory: what is the foundation of political obligation? In other terms, what commands respect to collective rules and laws? To answer this question, they find a resource in the etymology of the word “common”, which derives from the Latin notion of “*munus*” combined with the prefix “*cum*” (meaning “with”). Based on the work of the linguist Emile Benveniste (1969, p. 96-97), they remind that the notion of *munus* belongs to the lexical field of the gift and reciprocity in Indo-European languages. More precisely, it refers to certain advantages associated to public duties and offices: any citizen holding a public office receives symbolic and material advantages and in exchange is expected to perform specific tasks. Reciprocally, the term “*immunitas*” refers to an exemption from a public duty or to a citizen’s attempt to escape such obligation. Thus, the notion of *munus* points to a form of reciprocal obligation linked to the exercise of public tasks. Consequently, Dardot and Laval consider that the term “common” is particularly well-suited to designate the political principle of a *co-obligation* founded upon a *co-activity*. Indeed, according to their definition, the common is a political principle asserting that “*obligation only exists between those who participate in the same activity or the same task*” (2015, p. 23).

If the common is defined as a principle, it then differs from an object, a substance, or a quality belonging to a thing or a set of things. A principle is what comes first and founds all the rest. It is a beginning that governs and guides all that follows: “the common is a political principle in the sense that it orders, commands, and governs all subsequent political activity” (2015, p. 579). Not only the common is a political principle, but it is the principle of *politics* itself defined as “the deliberative activity in which men collectively determine what is just, as well as the decision and action proceeding from this collective activity” (ibid, p. 579). It becomes clear that the collective activity that founds political obligation is an activity of co-deliberation and co-decision regarding justice, in which every person can participate on an equal footing. The quasi-synonymy posed by Dardot and Laval between the common and politics is highly reminiscent of the one that Castoriadis posed between autonomy and politics. And this is even more true if we consider the proximity of their respective definition of politics. Still, the shift from

¹⁸⁴Original title : « *Commun : essai sur la révolution au XXIème siècle* ».

autonomy to the common is not purely semantic but comes with a series of displacements and innovations which situates the latter in a new era of struggles as we shall see.

Pierre Dardot and Christian Laval's theorization of the common as a political principle finds a crucial source of inspiration in Aristotle's conception of the institution of the "common" (*koinôn*) and of the activity of "putting in common" (*koinônein*) (Nicomachean Ethics, IX, 10). According to their reading, Aristotle considers the existence of a political community results from an "activity of putting in common words and thoughts" (*koinônein logôn kai dianoias*). It is not the existence of an already constituted political community that guarantees within its framework the possibility to put in common words and thoughts but, to the contrary, it is this activity of putting in common which constitutes the political community. Dardot and Laval try to push further this argument and precise what it implies to found political obligation upon co-activity. Firstly, it means that political obligation cannot be based upon mere belonging to a cultural or ethnic group, to a nation, or even to mankind as a whole. The common derives from activity, not from being. It does not refer to the supposed common characteristics of all humans which would define them as humans, to a universal human nature in other terms. The collective subject of the common does not pre-exist to, but result from, the collective activity of men and thus:

"If there is some 'universality', it can only be a practical universality, that which arises from every individuals who, in a given time and under given circumstances, engage in the same task" (2015, p. 49).

Secondly, the common must be distinguished from what may be called the "common good" (that is, the just) since it is not an object or an end. The common is rather the principle that orients the search for the "common good" *qua* object, "since truly seeking the common good necessitates common deliberative activity" (2015, p. 580). The primacy of the principle matters here to avoid statist and theological conceptions of the common good, which would enable the state, the church, or any sort of alleged technical or ethical experts to monopolize the definition of the common good. Thirdly, saying that political obligation is founded upon co-activity means that it has no extra-social source, "it draws all its force from the practical commitments binding all those who collectively developed the rules governing their activity, and it is only valid in relation to the co-participants of this same activity" (ibid, p. 580).

In addition to the notion of the common as a political principle, the two political theorists use the term "commune" to name the local self-governed polity and the term "commons" to name the institutional experiments in which the collective activity of individuals takes in charge diverse objects in accordance with the principle of the common. Thus, a commons is not simply an object but also its relation to the collective subject which emerges when individuals gather to institute and govern it as a commons through the co-production of rules. Only the practical co-activity of putting in common (or commoning) can institute an object as a commons. For this reason, Dardot and Laval consider the juridical category of "*res communis*" (common things) should be abandoned. Indeed, the latter derives the inappropriability of specific objects from their natural characteristics. On the one hand, this drastically limits the number of objects that may escape the sphere of property. On the other hand, by separating such things from the co-activity of men, it founds their inappropriability on very fragile grounds: since this

inappropriability is not properly instituted in law, as soon as they become technically appropriable, law cannot forbid their private appropriation. Similarly, the two authors criticize the naturalist typology of economic goods which, they believe, unconsciously inherits from the legal tradition of *res communis* and reproduce its mistake of reifying the common.

Pierre Dardot and Christian Laval contend that the common is the principle of a new law – the law of the common – which will have to be instituted against an old law – the law of property. The commons should not be conceived and instituted as a fragmentation or a collectivisation of property, but as the creation of new use rights beyond and against the realm of property.

The two political theorists discuss a distinction made by Aristotle between two forms of commoning. The ancient philosopher condemns the first which consists in putting in common “goods” to turn them into common property. Yet, he promotes the second, which consists in putting in common words and thoughts in a way that creates a political community (or political common) existing outside the realm of property. Dardot and Laval are not convinced by Aristotle’s prescription regarding the economic domain: the ancient philosopher defends the private property of goods and their common use (Politics, II, 5). Legislation and education would encourage owners to share their private goods, but the common use of those would ultimately depend on the virtue of their owners. The two political theorists consider that Aristotle underestimates the extent to which the institution of private property shapes conducts in a way that necessarily undermines common use. They focus on the second type of commoning and underline that the political common it creates cannot be an object of private or collective property since it is not an object at all. It is this type of commoning that they wish to extend to the economic domain: a commons is not only nor primarily a shared good, but an institution of self-government dedicated to the collective use of a good. Thus, the unappropriability of a commons not only concerns the resource it contains but foremost the collective activity which takes it in charge.

The notion of commons hence “breaks with the polarity of the subject and the object, of an object offered to the sovereign mastery of the subject (as in the relation between the *dominus* and the *res*), a polarity so often reproduced in a certain legal and philosophical tradition” (Dardot et Laval 2015b). For this reason, it may open a space of reflection¹⁸⁵ on the relation between men and their environment, humans and non-humans, as Ugo Mattei suggests:

“A phenomenological understanding of the commons forces us to move beyond the reductionist opposition of ‘subject-object’, which produces the commodification of both. It helps us understand that, unlike private and public goods, commons are not commodities and cannot be reduced to the language of ownership. They express a

¹⁸⁵ On this point, some bridges may be built between left-wing humanism (especially Marxism) and ecological philosophies rejecting the distinction between nature and society (e.g., Bruno Latour). I personally chose to keep the distinction between nature and society (see Chapter 1, “The limits of constructivism” and “Castoriadis and the imaginary institution of society”) and adopt Castoriadis’s social ontology. Still, this social ontology – which also grounds Dardot and Laval’s political theory – does not seem incompatible with a certain relativisation of the subject-object polarity permeating the modern understanding of property law. If we consider the extent to which property law informs the exploitative relation of society to nature, the importance of this “relativisation” cannot be overstated.

qualitative relation. It would be reductive to say that we have a common good. We should rather see to what extent we are the commons, in as much as we are part of an environment, an urban or rural ecosystem. Here, the subject is part of the object” (Mattei s. d.)

Furthermore, the notion of “use” may take on different meanings. The sort of use associated to a commons is specific and may be described as an administrative use. It stands radically opposed to the idea of consumption which represents the endpoint of a certain form of use (“*se servir de*” in French) that relates a proprietary subject to an external object. The use rights involved in a commons come with a notion of “use” that comes close to care, preservation, or guardianship. Administrative use contrasts with the relation of a proprietary subject to a thing in multiple respects: a commons is not a thing, it is instituted as unappropriable, the collective subject that takes it in charge is not related to it externally but internally, and this collective subject does not pre-exist to that co-activity. We saw earlier¹⁸⁶ that a major limit of theories of the commons promoting the fragmentation of property in a bundle of rights that may be distributed and shared, is that these rights (and their holders) are unequal and cannot be expected to coexist peacefully. Against this parcelling, Dardot and Laval promote the inseparability of the rights to use and to administer.

They propose to reconceptualize the notion of “administration” in a way that differs from its traditional understandings. Administration comes from the Latin “*ministrare*” meaning “to serve” (“*servir*” rather than “*se servir de*” in French). They identify two major understandings of the notion of administration in modern western philosophy. The first comes from the republicanism of Jean-Jacques Rousseau. It understands the administration as the government or executive power and insists it must be subordinated to the sovereignty of the legislative power. The “ministers” of a government are then considered as the “servants” of the sovereign legislative body. The second is associated to the technocratic socialism of Henri de Saint-Simon. It praises the advent of an industrial society in which a science of production will come to replace politics and where the “administration of things” will substitute for the “government of men”. The first conceives the administration as the government, whose role is to implement or execute the law. The second opposes the administration to the government, since the latter would represent a form of arbitrary command while the former would represent a rational management strictly guided by scientific truth. On one hand, administration is identified to government, on the other, it is identified to a purely scientific management. In both case, the notion of administration would exclude the possibility of a deliberation regarding ends: either because such ends are already prescribed by an external instance (the sovereign legislative assembly) or because they are neutralised by the objectivity of science. Rather than following any of these paths, Dardot and Laval suggest to reconceptualize the notion of administration as a collective practice linked to the use of the unappropriable: “Neither government nor management, but an active and collective use through which every individuals participate to the co-production of non-state juridical norms” (2015, p. 272). The “service” of “*ministrare*” can then be related to the care and preservation associated to “use”, while the use and administration of the unappropriable tends to become inextricable. The idea that the law of the

¹⁸⁶ See Chapter 3, “Against property”

common can be instituted autonomously from the state and form the foundation of a radical participatory democracy meant to replace representative democracy is central to Dardot and Laval's theory of the common – as we shall see in the next two sub-sections.

Although the law of the common will have to struggle against the existing law of property, the primacy of the common does not imply the abolition of private property nor that of the market. It rather requires subordinating them to the commons by subtracting certain objects from the realm of market exchange to reserve them for common use, and by suppressing the right of abuse (*jus abutendi*) which entirely surrenders an object to the egoistic will of its owner. The institution of a commons subtracts an object from the realm of property and market exchange, but it goes hand in hand with a certain understanding of the term “appropriation”. Indeed, Dardot and Laval distinguish two meanings of the term “appropriation”. *Appropriation-belonging* consists in making something one's own property or possession, whether this thing used to be vacant (*res nullius*) or whether it used to belong to someone else. Conversely, *appropriation-destination* consists in making something proper to a specific end. A commons is unappropriable in that it resists the first and most pervasive meaning of appropriation – appropriation-belonging. However, the institution of a commons represents a form of appropriation-destination, in that it subtracts an object from the realm of property in order to appropriate it to a certain end: for instance, appropriating a water basin to the satisfaction of the basic needs of local inhabitants as opposed to the profits of a company. As Dardot and Laval put it:

“Instituting the unappropriable is to subtract something from appropriation-belonging to better realise some form of appropriation-destination; it is, in short, to forbid its appropriation by anyone to better appropriate it to some social purpose – for example, appropriating land to address food insecurity. It is to regulate its use without becoming its owner, that is, without granting oneself the power to dispose of it as a master.” (2015, p. 583)

The political principle of the common does not imply the abolition of private property but it runs contrary to the private property (and even the collective property) over the means of production¹⁸⁷ for at least three reasons: planification, exclusion, and unlimited expansion. Regarding planification, we have already argued¹⁸⁸ with Benoit Borrits (2018) that property over the means of production encourages the dissociation of command (located in the hands of the proprietary subject) and execution (to which the activity of the reified workers is reduced). In other terms, it implies to found co-obligation on property – which allows its owner to sovereignly take the decisions which the workers are obliged to execute – rather than on the co-activity of workers who would co-produce the rules that oblige them. In his analysis of the Hungarian revolution of 1956, Castoriadis formulated the principle underlying this experience of workers councils and workers' self-management: “No execution of decisions without participation to the decision-making process” (Castoriadis 2013, p. 389). Dardot and Laval consider this phrase as another formulation of the principle of the common: “only co-

¹⁸⁷ It is therefore compatible with what Pat Devine calls market exchange but not with what he calls market forces (see Chapter 1, “Three perspectives on autonomy in the industrial age”).

¹⁸⁸ See Chapter 3, “Against property”.

participation in decision-making produces co-obligation in the execution of decisions” (2015, p. 87). In short, *the political principle of the common is meant to prevail in the socio-economic sphere as much as in the political sphere*, which is incompatible with both private and collective property over the means of production. Regarding exclusion, we have also argued with Borrits that property over the means of production strictly excludes from decision-making those who are not owners. It creates hermetic frontiers around a proprietary subject destined to compete with others, which prevents *a priori* the institution of associative linkages that could recompose existing collectives to work towards a form of “practical universality”. Regarding unlimited expansion, we have seen that the private property (and arguably also the collective property¹⁸⁹) over means of production entails a dynamic of capital accumulation which unceasingly expands the market sphere to the expense of the commons.

In spite of the deep and obvious affinities between Pierre Dardot and Christian Laval’s political theory of the common and Cornelius Castoriadis’ political theory of autonomy, we can identify some displacements and innovations distinguishing the former from the latter. A first displacement concerns the conception of the collective subject of politics. The collective subject of autonomy is a *dèmos* (people) which is to some extent considered as pre-existent (though in constant self-alteration) and attached to a territory. Arguably, such a collective subject is more susceptible to derive towards a form of self-closure on its own interests and to enter in competition with other peoples than the collective subject of the common. Dardot and Laval’s conception of the collective subject of politics appears more abstract and unstable but slightly more alert to the risk of self-closure (especially in the form of nationalism) and insistent on the need to build cooperation beyond any form of frontier.

The second and most important displacement concerns the centrality of the issue of property and law in the theory of the common. Castoriadis’ political reflection has been decisively marked by the recognition that the transformation of relations of property in the USSR did not effectively transform the relations of production: workers did not gain more control over production although the means of production were owned by a state supposed to represent their interests (a “workers state”). Consequently, he considered that juridical relations of property were secondary in regard to the effective sociotechnical organisation of production and did not give them much attention¹⁹⁰. On the contrary, the issue of property and law is absolutely central to Dardot and Laval’s political reflection, which is strongly inspired by Proudhon in this respect. They consider that the notion of property and its associated imaginary significations encourages the reification of workers by recognizing the owner as a subject having an absolute right over a thing. Their theory of the common develops a parallel critique of property and sovereignty,

¹⁸⁹ Whether the productivism of the diverse regimes of “really existing socialism” had to do with a contingent choice of the bureaucracy or with a functional requirement of an economic system founded upon state property is a serious and complex debate. I would argue for the first alternative while qualifying the “contingency” of such choice by recognizing the objective context of inter-state competition which encourages economic growth as a means to power.

¹⁹⁰ See for instance this quote:

“It also becomes clear that socialism cannot be ‘objectively’ inscribed, not even at 50%, in a law or a constitution, in the nationalisation of the means of production or in planification, or even in a law establishing workers self-management: if the working class cannot manage production, no law will enable it to do so, and if it does, law will only acknowledge a given fact” (Chaulieu 1955).

Again, Pierre Chaulieu was one of Castoriadis’s nickname.

private and public law, and attempts to overcome their noxious dualism. They also consider that law can be a tool for emancipation whose production may be disconnected from the state. Finally, their theory responds to neoliberalism, not only by opposing commons to enclosures, but also by promoting an institutional construction of cooperative behaviours contrasting with the neoliberal construction of the self-entrepreneur.

Institution and subjectivation

The political principle of the common does not need to be instituted, but only to be recognized in theory and practice. However, the commons as well as the law of the common can only result from an act of institution. Pierre Dardot and Christian Laval developed the concept of “instituting praxis”¹⁹¹ (“*praxis instituante*” in French) in order to describe the sort of practice required to institute the law of the common and thereby the commons.

The notion of instituting praxis differs both from the notion of “constituent power” (“*pouvoir constituant*” in French) and of “instituting power” (“*pouvoir instituant*” in French). The terms “institution” and “constitution” both derive from the Latin word “*statuere*” which means to “erect” or “establish” and only differ by their prefix – “*cum*” meaning “with” in English while “*in*” kept the same meaning in English. The notion of constituent power was first developed by the French revolutionary Emmanuel-Joseph Sieyès (also referred to as the abbot Sieyès) and became crucial to the modern theory of sovereignty and representation. Sieyès was looking for an absolute, external and transcendent source to confer authority to the constitution, that is, both to the founding act of constituting new political institutions and to the actual text which describes their organization and represents the fundamental juridical norm. In the context of the French revolution, the constituent assembly was lacking authority to proceed to the act of constitution since it was itself anterior to that constitution, and thus, unconstitutional. The abbot Sieyès thus argued that constituent power did not originate in the constituent assembly (which was necessarily pre-constitutional hence unconstitutional) but belonged to the nation as a whole. The nation, as an abstract entity detaining constituent power, was considered to remain in a perpetual state of nature which situated it beyond and above all laws. Constituent power was then conceived as an absolute will unfettered by any prior law, a *potestas legibus saluta* or power absolved from the laws. Hannah Arendt remarked that this concept of an absolute sovereignty in which law and power coincided and which belonged to a unitary subject (the nation or the people) did not differ from the one that characterized absolute monarchy since at least Jean Bodin: “the French Revolution put the people into the seat of the king” (Arendt 1963, p. 156). If the nation as an abstract entity becomes absolutely sovereign in theory, in practice it

¹⁹¹ The French concept of “*praxis instituante*” is difficult to translate in English. The translator has to choose between two unsatisfactory options: translating the concept by “instituting praxis” or by “instituent praxis”. The official translation of Dardot and Laval’s book realized by Matthew MacLellan (2019) opted for the second option while I chose to opt for the first. A major problem with the expression “instituting praxis” is that it may suggest that “praxis” is the object of an act of institution, while the expression “instituent praxis” clearly refers to a form of praxis which itself consists in an act of institution. In other words, the term “instituent” more clearly appears as an adjective qualifying the noun “praxis”, while “instituting” may be mistaken for a gerund or a present participle though it is used here as an adjective. Another problem is that the term “instituting” is unable to convey the parallelism between the notion of “instituent/instituting praxis” and the notion of “constituent power”.

Still, I have sensible reasons to choose this imperfect translation. First, the word “instituent” does not really exist in English. Second, the notion of instituting praxis directly builds on Castoriadis’ philosophy which constantly use the notions of instituting society (“*société instituante*” in French) as opposed to instituted society. Speaking of “instituent praxis” would then force me to speak of “instituent society”, “instituent power” and so on. Thus, I would have been led to use the French-sounding term “instituent” so often that my writing could have seem to abusively distort the English language to bring it closer to ideas initially developed in French. Finally, the official translation of Castoriadis’ major work “*The Imaginary Institution of Society*” by Kathleen Blamey (1998) opts for the expression “instituting society” rather than “instituent society”. We may then say that I took Kathleen Blamey’s side rather than Matthew MacLellan’s.

only has the right to express its will through the voice of its representatives. Castoriadis argued that the absoluteness of national sovereignty which led to the terror does not derive from a desire for direct democracy but, to the contrary, is tightly woven to the representative principle: “Jacobinism turns mad and the Terror sets in from the moment people leave the stage while the indivisibility of sovereignty becomes the absoluteness of power, leaving the representatives in a sinister face-to-face with abstraction” (1989). Indeed, Sieyès’ theory of constituent power did not link the absolute sovereignty of the nation to the notion of democracy but to the representative principle, while explicitly describing them as incompatible with one another:

“Citizens naming for themselves representatives renounce and must renounce to make law immediately by themselves; they have no particular will to impose. If they dictated their wills, France would no longer be a representative state; it would be a democratic state. [...] The people, I repeat, in a non-democratic country (and France cannot be democratic), the people can only speak and act through its representatives.”
(Sieyès 1789)

Michael Hardt and Antonio Negri (2004, 2009) have proposed to radically redefine the concept of constituent power as a characteristic of the democracy of the multitude serving its project of dismantling sovereignty and the state. They consider that the multitude should aim for the destruction of established state institutions while creating alternative political institutions. They try to delineate the outline of such institutions based on three elements: 1) “Institutions are based on conflict, in the sense that they both extend the social rupture operated by revolt against the ruling powers and are open to internal discord”; 2) they “consolidate collective habits, practices, and capacities that designate a form of life”; 3) they are also “open-ended in that they are continually transformed by the singularities that compose them” (2009, p. 357). The contemporary struggles of the multitude would hold a constituent power in that they are oriented towards the construction of such political institutions, meant to consolidate and organise its immanent forces without forming a new sovereign power. Hardt and Negri describe as “constituent struggles” social movements such as the Indignados or Occupy Wall Street as well as the various insurrections of the Arab Spring (2012). On the contrary, Dardot and Laval (2015, p. 420) doubt that subsuming struggles that so deeply differ under a same notion help us to better understand them. More importantly, they argue that the notion of “constituent power” loses all definite meaning if it is stretched to describe the inventiveness of all sorts of struggles rather than a solemn act that founds new political institutions in the context of a revolution. The notions of “constitution” and “institution” thus tend to become undistinguishable in the writings of Hardt and Negri. Further, the notion of “institution” often slips from its political sense (the fundamental structuration of the legislative, executive, and judicial power within a society) to its sociological sense (all that has been instituted by society from mores and customs to religions and armies).

As Dardot and Laval remark, Hardt and Negri intend to overcome “the conventional opposition between the ‘sociological’ concept of institution and the ‘juridico-political’ concept of constitution in order to better theorize the radical immanence of society’s constituent power” (2015, p. 419). I believe the risk here is not only to mobilise a notion of “constituent power” which has been emptied from any precise meaning by the will to stretch it to all sorts of political

practice, far beyond what it was initially designed to render intelligible – that is, the most specific, solemn and founding political moment that may occur in a revolutionary context. It is more fundamentally to lose the sight of what makes the specificity of politics as a lucid, explicit and collective activity by drowning it in the routine and unconscious self-alteration of society.

At the end of *Multitude*, Hardt and Negri declare that:

“The fact that biopolitical production is at once economic and political, that it directly creates social relationships, and that it poses the base for a constituent power help us understand that the democracy of the multitude we are dealing with here bears little resemblance to ‘direct democracy’ traditionally understood, in which each of us would take time out of our lives and our work to vote continually on every political decision.” (2004, p. 350)

After having reduced economic production to a spontaneous and autonomous process of social reproduction which would largely escape capitalist control, the two philosophers come to dissolve politics in that diffuse socio-economic process. They establish a continuum between politics and the unconscious process of the imaginary institution of society. Such a continuum is problematic in that it tends to erode the foundation for any form of explicit and conscious decision-making¹⁹². The two philosophers develop a parallel critique of the theory of the subject and that of sovereignty. Both would represent the rule of “the one” and undermine the democracy of the multitude: “The entire tradition of political theory seems to agree on one basic principle: only ‘the one’ can rule, whether that one be conceived as the monarch, the state, the nation, the people, or the party” (Hardt et Negri 2004, p. 328). In the political field, this critique effectively attacks the idea of an indivisible and transcendent sovereignty concentrated in an overarching state, but it also delegitimizes any form of collective and conscious decision-making achieved by a self-governed commune or any small group. Indeed, such democratic process would reduce the multitude to the rule of one, that is to the rule chosen by the majority after a deliberative process. It thus remains unclear how Hardt and Negri’s political theory can inform concrete political practices. Regarding subjectivity, they affirm that: “The brain itself, moreover, does not function according to a centralized model of intelligence with a unitary agent. [...] There is no one that makes a decision in the brain, but rather a swarm, a multitude that acts in concert” (2004, p. 337). This postmodern critique of the philosophy of the subject tends to assimilate the idea of conscious decision-making to power concentration and authoritarianism. Overall, Hardt and Negri establish a problematic continuum between constituent power and what Castoriadis called instituting power.

As we saw, the notion of institution used by Castoriadis extends to all that may be instituted by society. It thus has the same extension as in the classical sociology of Emile Durkheim or Marcel Mauss: “There is no reason to reserve this expression [institution]

¹⁹² Hardt and Negri’s analogy between language and the organisation of the multitude is illustrative in that respect, in that the evolution of language is paradigmatic of the unconscious process through which society self-institutes:

“Perhaps we can understand the decision making of the multitude as a form of expression. Indeed, the multitude is organized something like a language. All of the elements of a language are defined by their differences one from the other, and yet they all function together. A language is a flexible web of meanings that combine according to accepted rules in an infinite number of possible ways” (2004, p. 339).

exclusively – as it is often done – to the description of the most fundamental social arrangements. By this word, we refer as much to customs and trends, to prejudices and superstitions, as to political constitutions and essential juridical organisations, since all these phenomena are of a same nature and only differ in degree” (Mauss et Fauconnet 1901). What characterizes the institution for Durkheim or Mauss and makes it the object of sociology is that it is pre-established at a social level, that it is exterior and superior to individuals and informs their conduct¹⁹³. The institution is fundamentally defined by its pre-established character, it is reduced to the instituted. The historical evolution of institutions is then approached as their modification and variation across time, mediated by representations which are also reflections of the instituted. To the contrary, the social ontology of Castoriadis highlights the primacy of the instituting society over the instituted society, by theorizing the radical imaginary as an instance which does not merely reproduce and recombine existing experiences and representations, but creates new forms, images and significations that cannot be simply deduced causally from the instituted. The instituting power is the diffuse power of creation which animates the social-historical:

“The fundamental ‘power’ in a society, the first power on which all others depend, is the instituting power, which I have also called above the infra-power. If we cease to be fascinated by ‘constitutions’, we then remark that such power cannot be located nor formalised, since it proceeds from the instituting imaginary. The language, the ‘family’, mores, ‘ideas’, as well as countless other things and their evolution, mostly evade legislation. In addition, inasmuch as this power allows for participation, everyone participates to it. We are all the authors of the evolution of language, family, mores etc.” (Castoriadis 1990, p. 165)

Instituting power can also be referred to as implicit power to better grasp its distinction from explicit power, that is to *the political* – which exists in every society and corresponds to the instance(s) capable of issuing sanction-bearing injunctions and which must always include at least a form of governmental and judicial power. While instituting power is a synonym of implicit power, the concept of constituent power refers to a specific form of explicit power. Politics consists in a project of autonomy, it represents the collective, explicit and lucid activity that questions existing institutions and aims to consciously institute just ones. Such a project of explicit and conscious self-institution is limited by the primacy of the instituting power, which emanates from the anonymous collective and mostly operates below the level of consciousness and will. Collective and lucid self-institution cannot be complete; it would be illusory and potentially dangerous for politics to think it can fully absorb and dominate the implicit infra-power¹⁹⁴. Still, as soon as a society recognizes¹⁹⁴ that its social institutions have no extra-social origins, it can explicitly question the legitimacy of any of them.

¹⁹³ For Durkheim: “We may call institutions all beliefs and types of conduct that have been instituted by the collectivity; sociology can then be defined as: the science of institutions, of their genesis and functioning” (Durkheim 1901).

For Mauss and Fauconnet: “are social, all those manners of acting and thinking that the individual finds pre-established et whose transmission is generally done through education” (Mauss et Fauconnet 1901).

¹⁹⁴ « No society will ever be totally transparent, first because the individuals that make it up will never be transparent to themselves, since there can be no question of eliminating the unconscious. Then, because the

The concept of instituting praxis comes close to Castoriadis' notion of politics in so far as it also points to a collective and conscious activity of institution. It may be understood as a specific form of politics, a politics tailored for the institution of a law of the common. To elaborate the notion of instituting praxis, Pierre Dardot and Christian Laval start from the famous phrase of Karl Marx reproduced at the beginning of this chapter:

“Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past” (1852).

On the one hand, instituting praxis cannot be understood as a creation *“ex nihilo”*. Any form of historical creation – including those associated with the type of human-making that politics represent – necessarily consists in a conditioned creation: it occurs under circumstances inherited from the past, under the weight of the instituted. Instituting praxis is thus a creation *“ex aliquo”*, based on something. On the other hand, by acting in given conditions, men transform these conditions and create new ones. Such creation is *“ex aliquo”* but *“sine causa”* (“without a cause”), in that the new conditions cannot be causally deduced from past ones. Dardot and Laval consider that the idea of a conditioned creation enables to avoid two symmetrical illusions: a pure idealism neglecting the weight of the instituted and a passive materialism reducing the action of men to the necessary consequences of existing conditions. Furthermore, the actions of men do not only transform external conditions: men are changed in the course of their action, their activity alters their subjectivity. Historical actors are produced as subjects in and through their action. Ultimately, instituting praxis consists in the self-production of a collective subject in and through collective action, and especially, in and through the continued co-production of juridical rules. It differs from constituent power in that “it does not have the solemn majesty of a foundational act and does not need a subject which pre-exists to it” (Dardot et Laval 2015, p. 441). It also differs from instituting power in that it points to a conscious activity of institution, one that establishes collective rules which cannot be reduced to mores or inherited customs, nor approached as a form of common law.

The notion of instituting praxis sheds light on the ability of groups to consciously create new collective rules which are not simply inherited from tradition nor result from an evolutionist selection mechanism. It also insists on the necessity to pursue the instituting activity after the initial act of institution, so as to limit the tendency of institutions to become inert and autonomous realities escaping the effective activity of men: “instituting praxis is therefore both the activity that establishes a new system of rules and the activity that tries to permanently revive this inaugural activity so as to avoid the ossification of the instituting within the instituted” (2015, p. 445).

social element implies not only individual consciousnesses, nor even simply their mutual intersubjective inferences, the relationships between persons, both conscious and unconscious, which could never be given in its entirety as a content to all, unless we were to introduce the double myth of an absolute knowledge possessed equally by all: the social implies something that can never be given as such. The social-historical dimension, as a dimension of the collective and the anonymous, initiates for each and every one of us a simultaneous relation of interiority and of exteriority, of participation and of exclusion, which can in no way be abolished or even 'controlled', in any definite sense of this term” (Castoriadis 1975, p. 166).

Carlo Vercellone and Alfonso Giuliani accuse Dardot and Laval of slipping into a sort of idealism “since it is no longer clear from which material conditions the common may emerge politically” (2019). In the absence of an identified pre-existing collective subject, their political theory would simply promote “a ‘capacity to act’ that is similar to a pure categorical imperative disconnected from the historical conditions through which this force of invention takes shape in the subjectivity of labour” (2019). This critique is quite powerful: the collective subject of the common is rather elusive and its revolutionary potential is not self-evident. Yet, on the contrary, the post-operaist perspective overestimates the contradictions between biopolitical labour and capitalist relations of production, and thus provides an empirical diagnosis that I consider inaccurate and over-optimistic. In that context, insisting on the importance of institutional creativity and analysing the diversity of institutional experiments giving shape to the common, seems sounder than postulating a trend towards the exodus of the biopolitical labour-force.

The extension and polysemic character of the notion of institution has sometimes given rise to misunderstandings and ambiguities in debates of political theory. Throughout this dissertation, we came across various meanings or layers of the notion of institution including, from the most extensive to the most restrictive:

- 1) The sociological notion of institution, encompassing all social habits and norms
- 2) Institutions as “working rules” in the sense of Elinor Ostrom, which are those that apply *de facto* to frame individual interactions in a particular context, and may differ from formal laws (*de jure* rules)
- 3) The political institutions which structure explicit power within a society and must always include at least a governmental and a judicial branch, even in stateless societies
- 4) The state, which we have defined with Castoriadis as “a hierarchically organized bureaucratic apparatus separate from society and dominating it” (1996).

In recent years, a debate emerged among the French radical left, opposing the communist theorist Frédéric Lordon to the anarcho-autonomist theorists revolving around the Invisible Committee. The former frames his theory in terms of self-institution and alternative institutions, while the latter associate the notion of institution to alienation and frame emancipation in terms of a struggle for “destitution” (2017). However, the approach of Lordon (2019) substantially differs from the one of Castoriadis in that it bears no definitive hostility to the state and even conceives revolutionary strategy in neo-leninist terms, as the conquest of state power. In the course of the discussion, the term “institution” often appeared as a euphemism for the term “state”, in a controversy which re-enacted and creatively re-adapted a very old debate between Leninist and libertarian currents of socialism. As he argued against Lordon, Serge Quadruppani (an author supporting the Invisible Committee) declared: “I am not especially fond of the destituent rhetoric of the I. C. but, to me it is simply the new clothes of good old libertarian ideas” (2019). Ideas coming from a tradition which includes Rosa Luxemburg or “*Socialisme ou Barbarie*” (the review animated by Cornelius Castoriadis and Claude Lefort from 1949 to 1967) he then precises. Indeed, the Invisible Committee is in line with the libertarian anti-leninism of Castoriadis and one can easily understand that this is what matters most to

Quadrupani. Still, the shift from self-institution to destitution is not simply rhetoric, nor is it innocuous. It comes with the ambition to abolish any form of money, police, division of labour, or political power and with a radical suspicion against any positive institutional proposal for a large-scale alternative to capitalism. Regarding the technosystem, such approach does not imply an internal transformation nor simply an external limitation, but more probably a brutal collapse. In this respect (and in spite of their numerous assets) the analyses of the Invisible Committee mostly remain entangled in what Castoriadis referred to as a “poor anarcho-Marxist utopia” (1999, p. 46) or “‘communism’ in its mythical sense” (1975, p. 164).

Instituting praxis, the law of the common and the state

Frédéric Lordon accepts institutions in all four meanings and encourages the conquest of state power. Castoriadis as well as Hardt and Negri want to dismantle the state but accept the necessary existence of institutions in the three first meanings; thus, they all promote the creation of alternative political institutions, though the latter may overestimate their immanence to spontaneous social reproduction. The Invisible Committee considers the notion of institution cannot be associated to emancipation which should rather be approached in terms of destitution. Obviously, they recognize the unsurpassable character of social norms and habits, but they forcefully reject the state and even tend to fantasize a society without explicit power. Where do Dardot and Laval stand in this debate and how does instituting praxis relate to the state?

In an interview, Dardot and Laval have declared: “We are anti-statist, but we are not against the existence of the state” (2014). Such a formulation may seem curious but it does point towards a coherent perspective which aims to “relativise the state level, from below and from above [...] to reinforce local forms of self-organisation and to work at a supranational level towards another political organization of the world” (ibid). Their normative perspective envisions the institution of a double federation which would gather and organize from the local to the global level and according to the principle of the common, the multiple commons composing the social-economic sphere (equivalent to the *agora*) on the one hand and the multiple communes composing the political sphere (equivalent to the *ecclesia*) on the other. The articulation between the social-economic sphere and the political sphere was historically constructed around the double principle of the *dominium* and the *imperium*: private property confers to the owner an absolute mastery over his property (*dominium*) and sovereignty was initially conceived as an analogue power (*imperium*) in the political realm. According to Dardot and Laval (2015, p. 467), though many efforts were made in political philosophy to break this analogy in order to exclude domination from the political sphere, it still holds in that sovereignty remains conceived as an absolute power. Modernity¹⁹⁵ has even strengthened the centrality of this dual principle by establishing in juridico-political thought a supreme division (“*summa divisio*”) between public law centred on sovereignty and private law centred on property, which later found the state-market dualism in political economy. The institution of a double federation founding the political and socio-economic sphere upon the principle of the common is meant to overcome this ancient duality of the *imperium* and the *dominium*. Consequently, the common is not conceived as a third sector getting by in the socio-economic sphere between the state-market or public-private dualism, but as a general principle which should inspire the refoundation of the socio-economic and the political sphere.

Proudhon (1863) already theorized such a double federation and represents a major source of inspiration for Dardot and Laval in this respect. The two political theorists remind that in his latest writings, Proudhon did not call for the suppression of the state anymore but for its relativisation through the construction of a global federation in which it would only represent

¹⁹⁵ According to Dardot and Laval (2015, p. 262) the division between public and private law only appears in the 16th century, under the influence of jurists such as Johann Apel. They insist on that point to show how recent this division is, contrarily to many (neo)liberal and socialist thinkers (including Proudhon) who believe it has its origins in ancient Rome and thus overestimate the continuity between modern property law and roman law.

one level among others. During most of his life, he believed politics (which he assimilated to the state) could be dissolved in the social and economic organization of society, asserting that “the workshop will replace the government” (1851) in a Saint-Simonian vein. Later, he came to consider that an industrial democracy organized in a federation of units of production, should be complemented by a political democracy organized in a federation of communal units; he moved from an anti-governmental position to a defence of political self-government. The federative principle limits the centralisation and indivisibility of sovereignty at the level of the nation-state in order to limit the dispossession of power from the local level in which effective participatory democracy can thrive. Simultaneously, it curtails the logic of inter-state competition and enables cooperation at various supra-national levels. Dardot and Laval emphasize the importance of such global cooperation to address contemporary global issues such as the ecological crisis. A neo-Proudhonian federalism could represent a way to surpass the Westphalian logic of inter-state competition without creating a global Leviathan they reckon. They also reject the illusion of a definitive solution to every social and political problems achieved at once through the conquest of the state or its ultimate destruction. Rather than suppressing or conquering the state, they thus propose to relativise it through the institution of new political forms at various geographical scales (Sauvêtre 2016).

Instituting praxis generally acts below the regulations of official laws enforced by the state and, if necessary, against them. To use Ostrom’s vocabulary, we may say that the law of the common it creates generally takes the form of *de facto* rules (working rules) which tend to differ from *de jure* rules (formal laws). Ultimately, a revolution should enable the law of the common to leave the shadow and become a *de jure* law, forming the base of a radical participatory democracy and a post-capitalist mode of production composing a double federation. Their conception of the revolution is based on Castoriadis for whom: “Revolution doesn’t mean civil war or a bloodletting. A revolution is a change in some of society’s central institutions by the activity of that society itself: the explicit self-transformation of society, condensed in a short span of time” (Castoriadis 2005). The revolution is thus a moment of acceleration and intensification of instituting praxis involving most members of a society. It is the moment in which instituting praxis turns into the explicit self-institution of society. However, far from neglecting what precedes and prepares the revolution, Dardot and Laval think that: “We cannot detach the existing experimentations of institutional forms and the historical moment of their crystallisation, that is the moment when a society gets to transform its central institutions; those things must be thought together” (2014).

Before the advent of a revolution, it may be strategic to struggle for an official recognition of some *de facto* rules established by instituting praxis or for some creative use of formal laws in favour of the emergence of a law of the common (e.g., Richard Stallman and the GPL). Moreover, the possibility to enter existing political institutions to promote a politics of the common attacking the centrality of property and pushing for an economy of the commons, empowering society’s autonomous initiatives and transforming public services into institutions of the common, is not completely neglected by Dardot and Laval: “A distinction should be made between the ideology of the conquest of state power and the idea that we may be led to govern according to a logic which is not the one of the state as a machine, or even to govern against the state” (Dardot et Laval 2014). They also reckon that the state is a complex field of

struggle between various groups (e.g., a state nobility often devoted to neoliberalism opposed to bottom public officers who often defend an ethic of public services) and insist that public services should in no case be abandoned but, to the contrary, extended and commonified. Still, if the idea to govern against the state or against the logic of the state as a machine can be inspiring, we may regret an insufficient consideration for the conquest of power through elections which is its necessary condition. A reformist perspective (closely related to the P2P theorists' idea of a partner-state) should not monopolize all hopes and energies, nor confine them within the walls of existing political institutions to the detriment of a revolution, but it may be a way to make some non-negligible steps forward in its absence.

Pierre Dardot and Christian Laval draw inspiration from various sources to envision the possible forms of a law of the common and of the process of its institution. A first source of inspiration comes from ancient Rome. We have seen¹⁹⁶ the limits and fragilities of the juridical notions of *res communis* (common things) and *res nullius* (things without a master) in regard to the institution of commons. Roman law also distinguished the *ager privatus* (the private domain or lands) from the *ager publicus* (the public domain). Rich patricians used to own private lands which represented their *ager privatus*. On the other hand, the *ager publicus* or public domain comprised two very different forms of “public”: public in the sense of public/state property and public in the sense of public use. The state owned quantities of lands and could dispose of them according to its will; it could sell them for instance, but more often, would attribute their possession to citizens of the plebe. The plebeians who were then allowed to privately use or possess those lands could not own them (turn them into their *ager privatus*) since they remained under state property. Public in the sense of public use radically differed from such state property and corresponded to the notion of *res nullius in bonis* (things among the property of no person).

According to Dardot and Laval¹⁹⁷ (2015, p. 263), the establishment of a sphere of private goods that could be freely owned and exchanged by individuals did not really represent the founding pillar of roman law. Rather, it derived from a more fundamental operation through which certain objects were subtracted from the sphere of private property to be sacralised and assigned to the gods or to the city. Such objects fall under the category of *res nullius in bonis*. They cannot be alienated and exchanged; they are fundamentally instituted as unappropriable, as objects which are devoted to public use and beyond the realm of property. As a consequence of the sacralisation of objects instituted as *res nullius in bonis*, all other objects were freed from sacred obligations and thus opened to appropriation and exchange. *Res nullius in bonis* included such things as public squares, theatres, marketplaces, roads or rivers. They were not subtracted from the sphere of private and public property because of their natural characteristic, but because of the institutional decision to destine them to the public use of all citizens. Dardot and Laval thus consider that the institution of the unappropriable occupied a central position in roman law. It consists in a form of *non-state public* which is, within roman law, what comes closest to their understanding of the common and the commons. Yet, a significant difference remains: “though the use of *res nullius in bonis* by all citizens is indeed collective, their institutional affectation

¹⁹⁶ See Chapter 3, “Property as a bundle of rights and the commons as common-property”

¹⁹⁷ Their argument is based on an article of Yan Thomas (2002).

is only ever made by a relatively small and restricted caste of legal professionals” (2015, p. 268). Shouldn't the decision to subtract objects from the sphere of property and destine them to public use instead be made collectively and democratically? Certainly, in the view of Dardot and Laval who affirm that “nothing could be worse than abandoning the law to those whose profession is to enact it” (2015, p. 20).

The history of the workers movement is also rich in lessons to conceive the autonomous institution of a law of the common: “The question of a specific ‘proletarian law’ has been massively repressed in leftist thought, but it once occupied a central position in the work of many socialists who were concerned with both the continuity of workers’ customs – which were sometimes very old – and the scope of original institutional inventions” (Dardot et Laval 2015, p. 367). Beyond the existence of political parties, the workers movement was essentially characterized by the institutionalisation of multiple relations and practices of solidarity expressed in the various oral or written rules that sustained workers sociability in factories, trade unions, cooperatives and associations. Workers’ institutions inherited from a long tradition coming from medieval guilds, corporations, brotherhoods and companionship, which modern bourgeois regimes often attacked to leave no intermediate group of interests between the individual and the state (e.g., Le Chapelier law of 1791). Nonetheless, not only did they lean on and re-adapt this ancient legacy to a modern context, but they also represented an invention of new rules, organizational forms and practices of mutual aid.

The dynamism of workers’ institutions was especially salient in the late 19th and early 20th century, until they “were almost entirely converted into schools of subordination to the social-democratic or Stalinist oligarchies controlling political parties and trade unions” (ibid 2015, p. 399). The new primacy of bureaucratic political parties came to eclipse these institutions under the influence of orthodox Marxism (and especially Leninism), which insisted that the proletariat’s supposed political incapacity and lack of class consciousness, required it to be guided and represented by a party holding a monopoly over the science of history. This Marxist orthodoxy developed against other socialist traditions (e.g., Proudhon, Gurvitch, Leroy, Jaurès, Mauss) which did not only focus on (and sometimes completely neglected) the party-form and the conquest of state power but recognized the value of workers’ institutions and saw in them the premises of a future society. In the early 20th century, the historian Maxime Leroy paid close attention to the vivacity of workers’ institutions and argued it did constitute a form of law:

“To explain the statutes of workers’ associations, article by article, as so many laws, to confront the rules of the workshop, the rules of the strike, the rules of cooperation between workers, is to study a legal system that is unique to the proletariat. It is a law in formation, and thus a law already partially formed and applied, the object of which is to regulate the relations between members of these societies, and between the societies and their employers. It is a law unrecognized although written, and a law unknown but nonetheless applied” (Leroy 1913, p. 26).

Leroy’s argument was marked by the influence of Proudhon, who had already elaborated the idea that society could establish and develop its own juridical order below the official juridical order of the state. Proudhon believed that “civilisation is a product of law” and aimed to reconcile law and socialism (Proudhon 1863). He argued that workers would emancipate

themselves by autonomously developing a new type of law enabling them to control their collective force without inhibiting individual initiatives.

Against communism, which would conceive the community as one great individual absorbing each singularity, and against liberal individualism, reducing society to a sum of atomistic and abstract individuals, Proudhon considered society as a complex set of relations which could not be reduced to its elements nor subsumed into a single and separate whole¹⁹⁸. Against *imperium* and *dominium*, public and private law, society should progressively develop a social law corresponding to its form and whose sovereignty would eventually surpass the one of the state. As we saw, for long, Proudhon called for the dissolution of political institutions within society. He aimed for the dissolution of the “political constitution” within what he called the “social constitution” (that is the juridical self-organisation of society generated by the grouping of consumers and producers, associations, cooperatives etc.), before considering the latter should balance the former and represent its model. In many ways, the idea of a gradual development of a social law which can eventually surpass public and private law is reminiscent of theories of the common(s) as a mode of production (especially of the reformist narrative). Maxime Leroy even compared proletarian law to pre-1789 bourgeois law¹⁹⁹, in a way that recalls the Marxist analogy between the development of capitalism within feudalism and the development of socialism within capitalism. However, a significant difference is that it substitutes juridico-political lenses to techno-economic ones, which enables to better avoid techno-determinism, techno-philia and productivism. In addition, Dardot and Laval’s theory not only builds on the promotion of proletarian law and workers’ institution by Proudhon and the tradition of “associationist socialism” but combines it with the revolutionary tradition of council socialism exemplified by Castoriadis.

The Italian movement for commons (*beni comuni*) also displays interesting experiments to think of the institution of a law of the common. It has been stimulated by the works of the Rodotà commission which tried to introduce the notion of “common goods” in the Italian civil code in 2007 through a legislative proposal that was eventually abandoned (following the fall of the government of Romano Prodi). In 2011, the success of a referendum of popular initiative against the privatisation of water services at national scale has also emboldened multiple local initiatives, especially illegal occupations and municipal commons-oriented experiments.

The most notorious occupation has been the one of the *Teatro Valle* of Rome, which started in June 2011 and ended in August 2014 when the municipal authorities decided to evict the occupants (Sauvêtre 2016). Workers of the sector of live performance (e.g., actors, technicians, directors) decided to occupy the theatre in 2011 to oppose to its privatisation and more generally to denounce the damages related to precarity and budget cuts in the cultural sector. Throughout the occupation, performances were maintained and made gratuitous while an open general

¹⁹⁸ This social ontology has multiple affinities with the one of Cornelius Castoriadis as with the one of Michael Hardt and Antonio Negri.

¹⁹⁹ “Long before the appearance of royal ordinances, the bourgeoisie empirically developed rules that were opposed to feudalism and specifically tailored to their interests. The Revolution gave these rules real existence, transformed them into laws, and the Empire then turned these laws into codes . . . We are witnessing an analogue phenomenon today. It is again produced by the class physically closest to work. In the past, this was the bourgeoisie, but now it is the workers” (Leroy 1913, p. 26).

assembly constructed the programme and organised the theatre's management. The occupants declared the *Teatro Valle* was a "common good" which should be self-governed independently from the state and whose collective use should be protected as a "fundamental right". They attempted to gain an official recognition of their occupation and administrative use (a *de jure* recognition of their *de facto* rules) with the juridical help of Stefano Rodotà and Ugo Mattei who wrote the status of the newly created Foundation *Teatro Valle Bene Comune*. In doing so, not only did they aim to legalise the occupation, but they strived to demonstrate that law can be developed directly by citizens participating in a social movement rather than only be decided by representatives. However, municipal authorities refused to recognize the foundation and ordered the eviction of the theatre.

Conversely, the politics of the common in Naples was launched from the town hall and illustrates the idea of governing "according to a logic which is not the one of the state as a machine" (Dardot and Laval 2014)²⁰⁰. At the instigation of Alberto Lucarelli, a former member of the Rodotà commission newly appointed "common goods adjunct" by the mayor Luigi De Magistris, the municipal council of Naples took a series of decisions in 2011. One of them transformed the private company that managed the city's water services into a public law company with a special status, *Acqua Bene Comune (ABC) Napoli*. The board of directors and surveillance committee of *ABC Napoli* did not only include members of the municipality, but also workers of the company, representatives of environmental associations and of the city water's users. That municipal decision thus instituted a local commons or – more precisely – a local public service governed as a commons. Another decision legalised the occupation of the cultural centre of the *Ex-Asilo Filangieri*, started by workers of the cultural sector who were managing it according to principles of "self-government" and "collective use" formalised in rules that they wrote with the help of jurists. Furthermore, the municipality experimented participatory processes by summoning thematic assemblies in which citizens would come and propose reforms that the city's administration was required to examine. This dynamic of institutional experimentation stopped in 2014 as a consequence of Luigi de Magistris' decision to dismiss Ugo Mattei from *ABC Napoli* and Alberto Lucarelli from the municipality of Rome. Nonetheless, it inspired multiple other commons-oriented municipal experiments in other Italian cities – especially Bologna.

Finally, we have seen that the free software movement has been able to subvert copyright law to protect and stimulate the development of digital commons. A juridical system allowing to institute commons beyond property could possibly be better suited to the development of digital commons. However, in its absence the creation and success of multiple commons-oriented licences by activists and law scholars has exemplified a form of creative appropriation (or hacking) of existing laws which demonstrates the juridical creativity that may characterize social movements such as the one of free software.

²⁰⁰ In practice, this idea meets the "partner-state approach" promoted by P2P theory.

Envisioning an economy of the commons beyond property

Theoretical efforts to develop institutional proposals for a viable large-scale alternative to capitalism, are sometimes regarded with contempt or suspicion by portions of the anti-capitalist left. They can be ridiculed as a vain pastime of radical theorists building paper utopias in a complete disconnection from their concrete political conditions of realization. They can also be condemned as technocratic and authoritarian in that they would each represent a complete theoretical system elaborated by a megalomaniac mind to be forced upon social reality (Amara 2019). On the contrary, I belong to those who consider they can be useful and constructive as long as we acknowledge the limit of such exercises. Firstly, an institutional proposal is indeed no more than an idea, a theory which is devoid of material force unless it is able to grip the masses. Yet, in a time when it is a commonplace to say that “it has become easier to imagine the end of the world than to imagine the end of capitalism” (Jameson 2003), envisioning practical alternatives to the current economic system can help to crack the instituted imaginary and constitute a substantial source of hope and mobilisation. It is also crucial to reflect upon the reasons which led socialist revolutions of the 20th century to be crushed (e.g., Spanish revolution) or to degenerate into bureaucratic dictatorships. One of the reasons explaining these outcomes is the lack of precise ideas regarding the way to organize production beyond capitalist and state property.

Secondly, a proposed alternative to capitalism (e.g., Borrits 2018; Coutrot 2002; Devine 2019; Friot 2012) does not necessarily consist in a definitive theoretical system leaving no room for political decision. It can be taken as a starting point for collective reflection and action rather than fetishized as an absolute. Such proposals should also be designed to be open to revision, to leave as much room for manoeuvre and local adaptation as possible. They should serve to liberate post-capitalist imagination rather than lead to the division of anti-capitalist forces in multiple chapels arguing over pointless technical details. The accusation of technocracy and authoritarianism directed against the formulation of any positive institutional proposal is quite curious. Castoriadis (1975) criticized Marxism’s pretention to constitute a complete and definitive theory of history – one that would scientifically reveal its laws and direction – by showing how it founded the technocratic domination of the specialists of this theory. However, the above-mentioned institutional proposals only present themselves as limited efforts to contribute to the advent of an alternative economic system. Politics is not based on an exhaustive and absolute knowledge, but in so far as it aims to be lucid and rational it calls on an effective knowledge which is relative, limited, provisional. In the absence of such knowledge, politics is reduced to the spontaneity of a blind reflex. That being said, I will now briefly outline the institutional proposal that Benoit Borrits (2018) developed as a possible instantiation of the political principle of the common in the economic sphere.

Benoit Borrits’ inquiry starts with an analysis of the shortcomings and failures associated to the main historical attempts to surpass the private property over the means of production: cooperatives, state property, and council socialism. The last one side-stepped the question of property, whereas the first two experimented collective property at different scales (the enterprise and the nation-state).

As we have seen²⁰¹, Borrits argues that the cooperative movement has seen important successes but does not represent a transformative force anymore. In a cooperative, capital and its logic are curtailed by a set of rules but they are not suppressed. Decision-making power is not determined by the number of shares a person holds (as it is the case in a capitalist enterprise) but based on the principle “one member = one voice”. The objects clause of a capitalist enterprise (the activities it intends to perform) is subordinated to the objective of increasing the value of the invested capital, whereas in a cooperative the latter is subordinated to the former and the remuneration of capital is wilfully limited. When a cooperative makes a profit, it is rarely distributed among members but generally added to the indivisible reserves. Cooperatives thus comprise two forms of property: social shares and indivisible reserves. The difference between social shares and shares in a capitalist company comes from the rules the former impose to limit the rights usually associated to ownership. Nonetheless, a social share remains a private property title. On the other hand, indivisible reserves consist in a form of collective property that belongs to all members of the cooperative and which none can privately appropriate. Yet, as any form of collective property, it only belongs to the proprietary community and excludes non-members: a cooperative remains a limited collective with proprietary interests to defend against the outside. When it encounters significant success and growth, the initial values tend to be forgotten while the logic of capital resurfaces. Such phenomenon is more frequent in user cooperatives where it takes the form of bureaucratic degeneration²⁰². Worker cooperatives rarely grow enough to face such issue, but they sometimes do as the case of Mondragon demonstrates. The Mondragon corporation is a very successful federation uniting hundreds of worker cooperatives employing more than 74 000 workers. Cooperative principles and values remain important in the group but they were violated in the course of its internationalisation in the 1980’s. The group’s cooperatives started buying foreign companies without turning them into member cooperatives. Instead, they turned them into subsidiary companies that they owned and in which they sometimes chose to dismiss workers. Members of the Mondragon cooperatives refused to let the workers of the foreign companies buy social shares and become cooperators because it would have forced them to share the indivisible reserves with the newcomers.

The USSR represents the paradigmatic example of the attempt to surpass capitalism by substituting state property to private property over the means of production. Property always implies that the owner commands or plans what the production units will execute. While the capitalist (or its managerial representatives) plans production at the scale of a firm, in the USSR the party-state planned production at the national scale. The complete centralisation of economic command at the top of the state necessarily brings authoritarianism. Furthermore, the plan of the capitalist enterprise has to confront the market while the national plan does not. Planning production amounts to make anticipations regarding consumption: what will consumers demand in the coming year? Answering precisely this question is impossible since consumers themselves do not know what they will demand in the near future. In a market economy, prices adjust to the confrontation between supply and demand to reward the enterprises which made correct anticipations (with higher prices) and sanction those which did

²⁰¹ See Chapter 3, “A new mode of production?”.

²⁰² Ibid.

not (with lower prices or no sales). In a nationalized economy, the entire population is sanctioned when the bureaucrats' forecasts are mistaken: the USSR saw cases of mass production of undesired goods alongside rationings of highly-demanded products. Therefore, the difficulty to express consumers' choices represents a central problem associated to the integral planning of the economy at the national level. Moreover, state property still remains privative or exclusive in regard to the outside. This fact was salient in the process that led to the schism between Stalin and Tito: soviets defended the interests of their national companies operating in Yugoslavia to the detriment of Yugoslavs.

Finally, Borrits analyses two historical experiences inspired by council socialism: the Spanish revolution and Yugoslav communism (especially in its last phase). The model of council socialism corresponds to the economic ideas of Castoriadis: workers expropriate capitalists, directly manage their production units locally and organise federally to define a common plan of production. These two historical experiences imperfectly illustrate this model: the Spanish revolution briefly surged in a context of civil war before being crushed, while the Yugoslav institutions of economic democracy were limited by the power of the communist party-state. The main conclusion Borrits draws out of them is that the integral planning of production is no more practical in the context of council socialism than in that of centralized state property. If self-managed production units cannot reach a consensus over a common production plan, they end up competing against one another to defend their proprietary interests – this trend started to take form towards the end of the Spanish revolution. In the 1970's, the Yugoslav communist regime also experimented a form of bottom-up and integral planning of production, but it resulted in economic disorganisation and an accumulation of paperwork. From 1950 to 1964, however, the country's fast-growing economy (about 12% growth per year in average) was efficiently supported through a planning of investments by a socialised financial sector. If the latter was controlled by the Yugoslav communist party, Borrits considers a comparable financial system could function democratically. Therefore, he claims post-capitalist institutions should combine market exchange with different planning instruments.

Benoit Borrits' post-capitalist model aims to surpass any form of property over the means of production through the socialisation of revenues, the socialisation of investments, and the transformation of enterprises into productive commons.

In the 20th century, social contributions were invented and adopted by most countries around the world. According to Borrits, they partially but directly contest the power conferred by the private property over the means of production: they limit the owner's control over the value generated within his company. Some of these contributions correspond to a delayed wage: they enable workers to get a revenue when they are unable to work (e.g., unemployment, retirement, sick leave). Another part of these contributions correspond to a socialised wage: they finance non-market public services such as public hospitals and schools. Borrits proposes to reinforce both of them – especially socialised wages to expand the scope of public services – and to create a third type of contributions dedicated to collective investment. The latter should enable to substitute collective and democratically-oriented investment to private capitalist investment. They would support the creation of a socialised investment fund enabling the provision of loans to self-managed enterprises. The repayment of these loans should keep the

socialised investment fund afloat and allow to progressively reduce to zero the investment contributions.

Besides social contributions, Borrits proposes to socialise revenues through an original mechanism that would partially or totally disconnect workers' revenues from the success of the enterprise they are engaged in. A percentage of the wealth produced by each enterprise (calculated by the cash flows from operating activities²⁰³) will be extracted monthly and redistributed to each enterprise in the form of allocations whose number depends upon the full-time equivalent jobs it provides. That percentage represents the portion of workers' revenues which is guaranteed and disconnected from the success of the enterprise they work for. If that percentage is set at 100%, the disconnection is complete. However, it can be set at any level depending on democratic decision-making. Each enterprise or independent worker would be able to know each month, through a simple calculation whether it can benefit or must contribute to the mutualised funds. A (partial) stabilisation of workers' revenues is especially important in the context of self-managed enterprises. Indeed, in a capitalist enterprise, wages are fixed and profits vary according to the difference between wages and added value. To the contrary, in a self-managed enterprise, workers have control over all the added value: their gains are higher but they are not fixed anymore. Another advantage of the mutualisation of revenues is that it provides a powerful instrument of macroeconomic policy: the percentage can be increased to stimulate employment when necessary and set lower in times of high-employment. Finally, Borrits' proposition is simple and flexible enough to be substantially modified according to democratic choices: what should be the level of the percentage? Should we distribute the allocation unconditionally or only to active workers? Etc. Therefore, rather than seeing it as another proposal in competition with others (e.g., the multiple versions of the universal basic income, Bernard Friot's "lifetime wage"), it is better understood as a mechanism which can support the realization of numerous forms of revenue socialisation.

The originality of Benoit Borrits' contribution essentially resides in his proposition to surpass property – *literally* – by creating self-managed enterprises exclusively financed by debt, that is with no capital stock. A company can finance its assets either through debt or with its capital stock. The company's assets comprehend all the resources it owns or controls: its cash, its fixed capital, the workforce it pays, raw materials, stocks of products etc. The total value of these assets is strictly equal to the sum of the company's capital stock and debts which allowed it to finance them. The capital stock or net worth of a company is thus equal to the total value of its assets minus its debts. The capital stock initially consists in the money brought by an entrepreneur (or group of entrepreneurs) to create a company. The money is registered as assets, while the entrepreneur receives shares of the capital stock in exchange for it. The capital stock then increases when the company makes a profit and decreases when the shareholders grant themselves dividends. The company can also increase its capital stock by letting in new

²⁰³ "Cash flow from operating activities (CFO) indicates the amount of money a company brings in from its ongoing, regular business activities, such as manufacturing and selling goods or providing a service to customers. It is the first section depicted on a company's cash flow statement.

Cash flow from operating activities does not include long-term capital expenditures or investment revenue and expense. CFO focuses only on the core business and is also known as operating cash flow (OCF) or net cash from operating activities" (Tuovila s. d.).

investors bringing in more money in exchange of shares. The crucial point is that the capital stock is directly tied to the notion of property whereas debts are not. The shareholder invests some money in a company with no guaranteed returns in exchange of property titles (shares) giving him the right to appoint a management team working for its interests. To the contrary, when a bank lends some money to a company, it has the guarantee of being reimbursed with predefined interests but does not gain control over the company. A company financing all its assets through debt thus has no capital stock nor owners. One may wonder what we would gain by replacing shareholders with creditors. According to Borrits, this all depends upon the identity of the creditors and the terms of the loans: this is where the socialised investment fund comes in.

One (or more) socialised investment fund (SIF) should be established either at a regional, national or supranational level after being kickstarted by the collection of dedicated social contributions. A democratic deliberation and decision-making process²⁰⁴ among the inhabitants of the chosen territory should allow to plan the investments according to their collectively expressed needs and priorities rather than based on profitability. The investments would be divided in budgetary envelopes dedicated to specific economic sectors (e.g., construction, agriculture, energy), types of use (e.g., research and development, material equipment) or regions (to avoid territorial inequalities). The budgetary envelopes support the provision of long-term loans to (propertyless and self-managed) banks which select the (propertyless and self-managed) enterprises that should be funded. Banks must refund the money borrowed to the SIF and are accountable for its correct allocation. Based on their customers' deposits and the SIF's loans, banks constantly fund self-managed enterprises for their long-term investments as well as their routine financial needs (working capital requirement). The SIF loans come with interest rates and banks slightly raise them in the loans they offer so as to cover their operating costs. Yet, interest rates have a completely different meaning here than they do in a capitalist system. They are not privately appropriated but transferred to other self-managed enterprises. The post-capitalist character of Borrits' proposal implies that no person can get remunerated for his money (shares and bonds would not exist). The SIF can fix positive, negative, or null interest rates: positive rates amount to a collective taxation, whereas negative rates amount to subsidizing. The socialisation of the financial sector thus enables to surpass property and to establish a democratic and loose planning of investments leaving much autonomy to production units.

Once they are freed from the constraints of property, enterprises can become productive commons that workers and users manage together based on decisions they take and which oblige them as co-participants rather than co-proprietors. Workers and users are the main stakeholders involved in the management of productive commons but other groups (e.g., associations, foundations, municipal authorities) could be associated in some cases. A capitalist enterprise can be created under different juridical forms in today's society (e.g., sole proprietorship, limited liability company, partnership). Similarly, productive commons could develop under a variety of juridical forms and different structures should be experimented. The

²⁰⁴ The precise form of this decision-making process is yet to precise and could involve various institutional mechanisms: open assemblies, citizens drawn by lottery, revocable elected officials, online consultations etc.

limited-liability company with an executive board and a supervisory board could be a source of inspiration to organize the dual power of users and workers. Workers spend most of their day in their company whereas users' attachment to a company greatly varies and is often lesser. Consequently, workers are in a better position to decide of the daily organization of production, while users are mostly interested in low prices and qualitative products. Borrits thus considers that workers should appoint their management team (executive board), while users should have a statutory right to collectively organize in assemblies when they deem necessary and appoint a supervisory board able to control the executive board. In most cases, users will remain demobilized and enterprises will be self-managed by workers. This is especially true in competitive economic sectors: unsatisfied users will simply choose to buy to another company. However, in other situations – especially in monopolistic or oligopolistic sectors – users will get involve in the management of companies. In such cases, a dialogue would develop between workers and users regarding the orientation of production and the level of prices. Market relations would be partially replaced by a deliberation over fair prices.

At a microeconomic scale, the involvement of users in the management of firms drives the planning of production towards use. At a macroeconomic scale, the democratic planning of investments also guides production in function of use value. Productive commons are based on association: they gather individuals who chose to work within them or to express their interests as users. On the other hand, the institutions of socialisation of revenues and investments are organized geographically: they gather the inhabitants of a defined territory. Borrits refers to them as “social commons”. Although social commons are structured on a geographical basis, their institution should result from a collective process of deliberation and decision-making: the co-obligation among participants to the social commons only comes from this co-activity. The institution of social commons should enable to surpass the limits of cooperatives – residing in their proprietary character – by turning them into productive commons forming the engine of a post-capitalist mode of production. Borrits thinks the socialist model he envisions cannot be set up by a government but only through autonomous political activity. Yet, he considers progressive governments could favour the socialisation process through diverse means. For instance, they could at least implement policies changing the distribution of the added value in favour of wages and to the detriment of profit (e.g., raise of the minimum wage, increase in social contributions, reduction of working-time with equal pay). Borrits argues that profits are artificially maintained through neoliberal policies which reduce the portion of wages in the added value. Inverting the trend could thus call into question the viability of capitalist enterprises and encourage workers to take over their companies.

The common and the relation between politics and technology

What conception of the relation between politics and technology underlies the theory of the common as a political principle? And how does it fit with the position I have developed so far?

The question of technology is not central to Pierre Dardot and Christian Laval's political theory. Yet, it is possible to loosely identify their location in the three debates we are concerned with. The fact that they adopt Castoriadis' social ontology and largely build on his political theory is a clear indicator in that respect. Consistently, they reject the Marxist theory of history, which allows them to avoid its problematic aspects (techno-determinism, technocracy, techno-philia and productivism).

Regarding debate (A), they can be described as critical constructivists. Technology appears to them as a social institution among others, with an instituted dimension (forming the circumstances inherited from the past) and an instituting dimension (creating new conditions that cannot be causally deduced from past ones). Since the ensidic organization of society is inseparable from social imaginary significations, then the technologies, administrations and markets composing the technosystem are biased by social meanings. Therefore, Dardot and Laval's political theory is fully compatible with – and can be usefully complemented by – the essential traits of Feenberg's philosophy of technology which we have adopted and combined with Castoriadis' approach (instrumentalization theory and the concepts of formal bias, technosystem, and democratic rationalization). Furthermore, Dardot and Laval explicitly reject strong techno-determinism:

“The question of common knowledge must therefore be addressed in terms of a ‘battle’ that spans the whole field of new technologies. In other terms, we must categorically reject those prophecies that forecast the inexorable arrival of a free society as a result of nothing more than the dissemination of digital technologies” (2015, p. 186).

Not only do they consider the distribution of digital technologies is not a *sufficient* condition for the re-foundation of political and economic institutions they call for, but they do not seem to consider it *necessary*. A large-scale self-managed economy, a commons-based alternative to capitalism, was possible before the advent of the digital age; it is not a possibility arising from digital technologies, as Gorz and P2P theorists argued. We can also remark that Borrits' institutional proposal is not particularly based on digital technologies and could as well be realized in an industrial context. However, digital technologies can facilitate information sharing among productive commons. While Borrits proposes to overcome the exclusive character of cooperatives by surpassing property through debt, P2P theorists suggest they should become “open” by contributing to knowledge commons shared at global scale. The two paths can easily converge to favour open productive commons.

Regarding debate (B), Dardot and Laval forcefully condemn technocracy in line with Castoriadis. They insist that politics is not based on a specialised knowledge held by a minority of experts and should not be monopolised by professionals. To the contrary, it is the matter of

anyone – whatever his status or profession – who wishes to participate in public deliberation. Consistently, they criticize the idea of an “evidence-based policy” by asserting that:

“A politics based on scientific truth would be no politics at all: without deliberation and the exercise of popular judgment, there can be no politics. A ‘scientific politics’ is not therefore a form of politics, but at most the scientist negation of politics, if not its outright annihilation.” (2015, p. 579)

This does not mean that the voice of scientific experts should be ignored or discredited in the public sphere. No doubt that scientific expertise is of utmost importance to have an informed public discussion on crucial topics of our time. It only means that scientific expertise has authority in a specialised field and should not be conflated with politics which concerns the totality of society. In this respect, some of the ideas of Castoriadis and Feenberg²⁰⁵ can complement Dardot and Laval’s approach and help establishing a constructive dialogue between lays and experts.

In regard to debate (C), Dardot and Laval do not show particular signs of enthusiasm nor disdain for technological progress. However, their discourse substantially differs from the techno-philia and productivism which impregnates to various degrees theories of the common(s) as a mode of production. Indeed, they consider that the environment is threatened by the “indefinite expansion of capitalism” (2015, p. 13). For them, the source of the ecological crisis lies in “capitalist illimitation” (p. 14) which means that “effective political ecology can only come from a radical anticapitalism” (p. 13). This ecologist critique of capitalism is extremely different from that of Hardt and Negri for instance, who condemn capital for fettering the development of productive forces. In this respect, the theory of the common as a political principle can be described as eco-socialist. It is even compatible with the degrowth perspective I have advocated, which proposes to struggle both for the radical transformation of the technosystem and the reduction of its size. While David Harvey prioritizes the struggles of the dispossessed over those of the exploited and post-operaists (as well as P2P theorists) promote a form of exodus from the capitalist technosystem, Dardot and Laval intend to articulate internal and external struggles. They remark that wage work remains central to social life and the construction of subjectivities and argue that the collective resistance of workers still represents a potential force of generalized opposition to capitalist domination. The principle of the common should not only orient social struggles outside the workplace or within cooperatives and associations, but as well within public administrations and private enterprises. The aim remains for workers to expropriate capital, takeover their companies and organize production on a democratic basis. Peer production can complement, but not completely replace, the organization of work in more stable organizations, that is in administrations. The democratization of administration can be inspired by Dardot and Laval’s redefinition of the concept as an active and collective use of the unappropriable through which individuals co-produce non-state juridical norms.

In addition, we should insist that the post-capitalist transformation of the technosystem is the necessary – but not sufficient – condition for its voluntary downscaling. Economic growth

²⁰⁵ See chapter 1, “Democratic rationalization” and “Autonomy and the imaginary institution of technology”.

(measured by GDP growth) represents the expansion of the technosystem, its colonization of lifeworld and continuous degradation of the environment. Degrowth cannot reasonably be pursued under capitalism. A capitalist economy without economic growth is not logically impossible, but it is socially and politically unstable (Kallis 2015a). For instance, Greece lost about a third of its economy following the 2008 crisis but capital accumulation did not disappear, profits were still made and private property was reinforced by the institutional changes forced upon the country. Giorgos Kallis points out the two reasons explaining the persistence of capital accumulation in a shrinking economy. First, in the absence of production growth, capital can still be accumulated through dispossession or redistribution from labour to capital. Second, even if aggregate capital accumulation is malfunctioning and decreasing, some capitalists will continue to invest money and make profit to the detriment of others who will go out of business. In a capitalist economy, economic growth thus defuses distributional conflicts between capital and labour on the one hand, and between all competing capitalists on the other. Simply put: a steady-state economy is a zero-sum game, so if there is capital accumulation somewhere, if someone gets more money than he had, someone else must lose some money somewhere.

In a post-capitalist system where workers collectively control the value they produce (e.g., Borrits' economy of the commons), the equitable and just downscaling of the economy becomes possible – not necessary. In the absence of capitalist exploitation and accumulation, economic growth will continue if workers decide not to consume all that they produce and instead reinvest part of it to increase productive capabilities. Since workers always produce more than what is required for their mere reproduction, there will always be a surplus. If that surplus is reinvested to produce more, there will be growth. A steady-state economy does not require no investment at all: productive capabilities should be maintained and investment can be reallocated from an economic sector to another. However, it requires zero net investment. To reach a steady-state economy, it is thus necessary to squander all surplus, all excess from production above what is necessary to satisfy the immediate needs of producers. Degrowth scholars have adopted the notion of “*dépense*” developed by Georges Bataille to theorize this process and its meaning:

“Dépense refers to the unproductive expenditure of the social surplus. How civilizations allocate their surplus, the expenditures they make above and beyond what is necessary to meet basic human needs, gives them their collective character. The Egyptians devoted their surplus to pyramids, the Tibetans to an idle class of monks, and the Europeans of the Middle Ages to churches. In today’s capitalist civilization, as the surplus is accumulated and invested to produce more growth, dépense is displaced to privatized acts of exuberant consumption. Since limiting excessive consumption alone would fuel even more saving and investment, degrowth envisions radically reducing the surplus and deploying it for a festive society in which citizens devise new, non-harmful ways to dispense it, ways that help build community and collective meaning.” (Kallis 2015b).

Economic growth – with its implications in terms of environmental destruction, social alienation and imperialism – could survive to a post-capitalist transformation of the technosystem were workers not to consciously decide and plan how to live with enough. That

is why the critique of the techno-philia and productivism still pervading some anti-capitalist theories (including anti-capitalist theories of the common(s)) is worth upholding.

Conclusion

“Technology has never really been the problem, nor will it ever be the solution. Technology does not by itself destroy democracy, nor does it bring democracy into being.”

David Noble, *Progress without people*, 1995, p. 66.

This PhD dissertation approached the various political and scientific discourses referring to the common(s) through four main research questions, two of which are descriptive (questions 1 and 3) and two of which are normative (questions 2 and 4):

- 1) What are the different theories of the common(s)?
- 2) How should we conceive and institute the common(s)?
- 3) How do the different theories of the common(s) understand the relation between politics and technology?
- 4) How should we understand and institute the relation between politics and technology?

On the one hand, the aim was to present and critically discuss the main theories of the common(s), by focusing especially on their understanding of the relation between politics and technology and the way it echoes older debates between critical theorists of politics and technology. On the other hand, it was to develop a personal normative position inheriting from the tradition of libertarian socialism and, more specifically, building on Andrew Feenberg’s philosophy of technology and the political philosophies of Cornelius Castoriadis, Pierre Dardot and Christian Laval. A particular conception of the relation between politics and technology was defined as an explicit or implicit position taken within (at least one among) three interrelated debates: (A) technological determinism vs. constructivism; (B) technocracy vs. epistemic democracy; (C) techno-philia vs. technophobia.

Throughout the three chapters of the thesis, I progressively fulfilled this twofold research objective and answered the four research questions. In chapter 1, I presented how the notion and question of technology emerged in the aftermath of the industrial revolution, while technological progress started to appear as an irresistible force driving the evolution of human societies. I explored how techno-determinist and constructivist theories of technology relate to the question of social emancipation (formulated in terms of autonomy) in the industrial age (1780-1975). I criticized techno-determinism and gave my main elements of answer to research

question 4), by arguing in favour of a singular combination of Andrew Feenberg's philosophy of technology and Cornelius Castoriadis' social ontology and political theory.

In chapter 2, I analysed central elements of the post-1975 restructuration of the capitalist technosystem and the way they responded to earlier social struggles and critical discourses. I presented the emergence of the reference to the commons in political discourse and academic research. I highlighted that the critical discourses referring to the commons emerged in response to the sociotechnical context of the digital age and discussed the way they interpret that context. In doing so, I started giving elements of answer to research question 1). The chapter also illustrates the idea that social transformations are not simply determined by an autonomous technological development by analysing the complex interactions between technology and society that gave shape to the digital age.

In chapter 3, I provided a typology of theories of the common(s), critically discussed some of the main theories of the common(s) and argued in favour of Dardot and Laval's theory of the common as a political principle. Thereby, I gave a detailed answer to research questions 1) 2) 3) and some complementary elements of answer to research question 4) by explaining how Dardot and Laval's approach relate to Castoriadis, Feenberg, and my previous claims.

I will now try to synthesize the main elements of answer to the research questions I developed along the thesis. To do so, I will start by focusing on the answers to the descriptive questions (1 and 3) before getting to the normative questions (2 and 4) as I present the theory of the common as a political principle.

Critical discourses referring to the commons emerged in response to the context of the digital age, though they inherit from ideas and practices of the libertarian socialist tradition which promoted autonomy and self-management in the industrial age. They became central within the alter-globalist movement that developed in the 1990's and 2000's to contest neoliberal globalisation. They focused on the critique of a central trait of neoliberalism: the private appropriation of multiple resources that were formerly owned by states, communities, or beyond the property system. The evocation of the history of enclosures in Great Britain was a powerful tool of condemnation which reminded that the state (with its monopoly on violence and on the definition of legality) had already played a crucial role in earlier processes of dispossession of resources used by the underprivileged. Indeed, the commons discourse does not oppose public property to private property but commons to enclosures in order to think beyond the state/market dualism. Thereby, it promotes alternatives to public and private property, while insisting that the state has no right to privatize the public assets it formally owns on behalf of a national community. The relative distrust towards the state can be explained by two contextual factors. On the one hand, the collapse of the Soviet Union and orthodox Marxism definitively discredited state-based bureaucratic socialism as an alternative to capitalism. On the other hand, the neoliberal transformation of the state radically re-designed its administrative functioning on the model of the enterprise, and redefined its objectives, which mostly became to create the most attractive environment for international investors. The commons paradigm also responds to neoliberalism by rejecting the neoliberal anthropology –

which sees man as a *homo economicus* conceived as a rational enterprise in competition with others for profit-maximization – to recognize man as a social being included in a specific culture and driven by motivations which are heterogeneous and non-fungible in a single quantitative measure (utility, or even, money). These multiple values and motivations render possible altruistic and cooperative behaviours which are hardly imaginable from the perspective of neoliberal anthropology. Individuals are not naturally driven towards cooperation nor towards competition, but rules and incentives can be established to favour one or the other. While neoliberalism aims to construct a framework that incentivises competition, the commons paradigm aims to construct rules favouring collective action (that constructivism comes from Elinor Ostrom’s approach but infused most commons discourses).

The commons discourse has a defensive dimension, stating that some resources (e.g., water, food, biodiversity, health, culture) are “not for sale” and should not be treated as commodities. It also has an offensive dimension stating that resources can be shared and managed fairly and sustainably by a community through the rules it creates. The spread of the notion of commons in political discourse also owes to the success of Garrett Hardin’s fable and its empirical refutation by Elinor Ostrom. Hardin claimed that rivalrous resources that are not privatised or strictly regulated by the state will necessarily be overexploited and destroyed since individuals seek to maximize their individual gains and neglect collective losses. Although his argument inspired generations of neoliberal intellectuals, Ostrom demonstrated that in multiple countries and for centuries, local communities have efficiently and sustainably managed natural rivalrous resources by establishing collective rules that incentivize cooperative behaviours. In addition, the commons discourse developed against the rise of the first dominant business model of cognitive capitalism, which consists in producing and selling information-intensive goods (e.g., seeds, software, brands, molecules, songs) that are protected by intellectual property rights enabling to sell each copy at a price high above its marginal production costs. It developed along and eventually converged with the free software movement that led the battle against this business model in the name of the free circulation of information. The free software movement demonstrated that thousands of volunteers could work together on complex economic projects, develop high-quality informational goods and share them as commons (e.g., GNU/Linux, Mozilla Firefox, Apache, Wikipedia). The digital age stimulated the rise of a new form of commons-based peer production which did not rely on managerial hierarchy or market competition. Yet, the second dominant business model of cognitive capitalism, that is platform capitalism, managed to respond and integrate the critique formulated by the free software movement by using digital commons as gratuitous inputs while encouraging user contribution and information-sharing on proprietary platforms.

Beyond this broad political use of the notions of commons and enclosures in activist discourse, diverse theories of the commons in the plural or of the common in the singular have been elaborated to analyse their empirical functioning or theorize their transformative potential. They rely on different epistemologies and ontologies, promote different normative and strategic views, distinct anthropologies and historical narratives etc. This thesis proposes a typology of theories of the common(s) that classify them into three main categories: liberal theories of the commons, theories of the common(s) as a mode of production, and the theory of the common as a political principle.

The first line of division between theories of the common(s) is between liberal and anti-capitalist theories. Liberal theories of the commons consider that commons are and should remain compatible with capitalism, whereas the two other types of theories consider that the common(s) can and should form the base of an alternative to capitalism. A second criterion of division between theories of the common(s) regards their respective conception of the relation between politics and technology. That criterion enables to distinguish between theories of the common(s) as a mode of production and the theory of the common as a political principle. Theories of the common(s) as a mode of production all inherit in a singular way from the techno-determinist theory of history developed by Marx. To the contrary, the theory of the common as a political principle builds on Castoriadis' social ontology and critique of Marxism and has strong affinities with its political theory. That criterion also permits to divide theories of the common(s) as a mode of production into sub-categories (reformist/mild techno-determinist, revolutionary/critical constructivist, apolitical/techno-determinist) and to underline differences among liberal theories of the commons. A third line of division between theories of the common(s) is between those considering that commons should be conceived and instituted as common-property and those considering that they should be conceived and instituted beyond the sphere of property. Many theories of the common(s) overlook this debate which mainly opposes Dardot and Laval to Elinor Ostrom and her disciples.

Liberal theories of the commons are divided into two main groups: on the one hand, the works of Elinor Ostrom and the Bloomington school, on the other hand, the works of different legal scholars (e.g., Yochai Benkler, Lawrence Lessig, James Boyle, Eben Moglen) engaged against the reinforcement of intellectual property rights since the 1990's. The former is mostly famous for her analysis of natural commons, while the latter mostly focus on digital commons. Rather than presenting the various works of these legal scholars, I chose to develop an in-depth discussion of Yochai Benkler's.

Ostrom has played a crucial role by demonstrating that local communities were able to govern common-pool resources (e.g., fisheries, pastures, forests) under common-property regimes by establishing rules that ensure a sustainable, efficient and fair use of the resource. Yet, her approach has many shortcomings in our view. Based on an amended version of rational choice theory, Ostrom's theory of the commons is the least critique of neoliberal anthropology. Her methodological individualism obscures the analyses of social structures of power and exploitation and depicts individuals and firms as equivalent rational actors. It promotes the illusion of a peaceful coexistence between commons, the state and the market, by overlooking that capital accumulation threatens the preservation of commons by constantly expanding the market sphere. Her theory does not aim to promote common-property regimes but to highlight the virtues of institutional diversity and the hybrid character of most institutional arrangements. The insistence on the mixed character of property regimes and the indifference to exploitation leads to blur the boundaries between institutional forms: she goes as far as suggesting that a capitalist firm is a form of commons. The analysis of property as a bundle containing multiple rights (e.g., use, exclusion, alienation) that can be attributed to various individuals and groups reinforces these shortcomings by further blurring boundaries and obscuring the conflicts between holders of different unequal rights. Approaching commons as common-property also risks to reconstitute the problems that the workers movement faced by defining socialism as the

collective property over means of production (we will recall them as we present Dardot and Laval's approach). Furthermore, Ostrom's theory does not fully abandon the naturalistic bias of the Samuelsonian typology of economic goods. The intrinsic characteristic of goods (exclusion and subtractability) would impose to produce and manage them in a certain way. We saw that this naturalistic bias is related to debate (A) in that the physical attributes of a good and the available technologies constrain or facilitate certain institutional arrangements, and to debate (B) in that experts are supposed to determine which institutions are the most "efficient" relatively to these affordances. However, Ostrom is clearly not a techno-determinist and it would be exaggerated to describe her theory as technocratic.

Yochai Benkler (2006) has claimed that the distribution of personal computers and internet access signals a break with the industrial information economy and creates a networked information economy in which nearly all individuals own basic means of information production and communication. The networked information economy would increase the role of non-market social production and give rise to a new model of information production, *commons-based peer production*, which is non-market, non-proprietary, and radically decentralized. The rise of social production would promote social justice by guaranteeing a free access to software, drugs, and scientific research while creating a more democratic public sphere. Benkler argued that social production only threatened incumbent firms of the industrial information economy (the first business model of cognitive capitalism) but should develop in harmony with the new firms of the networked information economy. Later, he became more critical of the latter as he saw the rise of platform capitalism. The main issue with his initial analysis was its sole focus on individual freedoms and the boundaries between the market and non-market sphere, to the detriment of an analysis of the distribution of value produced by online contributions. This shortcoming enabled capitalist platforms to indirectly exploit the digital commons produced by volunteer contributors and ultimately turn them against individual freedoms by integrating them to surveillance infrastructures. Benkler's thesis was significantly – though cautiously – technophile in that it argued that digital technologies may bring about positive social and political change (debate C). He cannot properly be portrayed as a techno-determinist (debate A): he considers that technology creates affordances which influence but do not determine social outcomes since these also depend on social practices and legal systems. Yet, I argued he overestimated the role of technology and underestimated that of class domination by suggesting that the centralized control and ownership of mass media essentially resulted from their techno-economic characteristics, while the characteristics of digital technologies would facilitate the democratization of the public sphere. To the contrary, I consider that mass media could be governed democratically and beyond property as much as digital infrastructures of communication.

Theories of the common(s) as a mode of production all inherit in a singular way from the Marxist theory of history. Following Castoriadis, I recognized in chapter 1 the existence of two antagonistic elements in Marx's works and in the history of Marxism: a deterministic element and a revolutionary one. Castoriadis as well as Dardot and Laval embrace the revolutionary element which sets the goal of a revolutionary self-transformation of society through a conscious political activity taking place in and building upon concrete conditions. However, they reject the deterministic element which dominates Marx's writings as well as the

history of Marxism and forms the armature of a theory of history that sees in the autonomous development of productive forces (especially technologies of production) the main force driving the evolution of human societies. In chapter 1, I have also reconducted Castoriadis' main critiques against the Marxist theory of history by arguing against its techno-determinism (debate A), its technocratic implications (debate B) – which legitimates the power of the specialists of this theory (the party vanguard) and of any regime able to accelerate the development of technology and production – and its techno-philosophy and productivism (debate C) – which associates social emancipation to the endless development of the productive forces. I believe one of the central contributions of this thesis consists in the close analysis it provides of the proximity between the different theories of the common(s) as a mode of production and the Marxist theory of history and of the extent to which they escape or not its techno-determinism, technocratic implications, and technophilia. For all these theories, the common(s) “presents itself, in a Marxist sense, as a new mode of production in the process of emerging, which unfolds within capitalism itself and could become dominant compared to the logics of the state and the capitalistic market economy” (Giuliani et Vercellone 2019). Their success in escaping the most problematic aspects of the Marxist theory of history significantly varies among them but is complete for none.

The perspective of Michel Bauwens and Vasilis Kostakis is reformist and mildly techno-determinist. They argue that the spread of digital technologies has radically transformed social, economic and political dynamics to re-shape them according to the logic of peer-to-peer (horizontal networks). Prior to the digital age, bureaucracies and markets were necessary for large-scale economic coordination, while the democratic governance of commons could only subsist at a local level. Digital technologies allow small-group dynamics to apply at a global level: a democratic and commons-based alternative to capitalism is now becoming possible. P2P theory is mildly technophile (C): it emphasizes the emancipatory potential of digital technologies but also values low-techs and material sobriety. It is mildly techno-determinist (A): digital technologies radically transform society and impose peer-to-peer dynamics everywhere, but they represent a field for social struggles whose outcome could be either capitalist or commons-oriented. It is also antitechnocratic (B) in so far as it criticizes hierarchical organizations and values horizontal networks. Commons-based peer production (CBPP) would represent a new proto-mode of production “developing within capitalism, rather as Marx argued that the early forms of merchant and factory capitalism developed within the feudal order” (Kostakis et Bauwens 2014, p. 51). P2P theory promotes cosmopolitanism: digital commons of software, knowledge and design should be produced and shared at global scale, while material production should be re-localized as much as possible. The maturation of CBPP would require the support of a partner-state and a mutually reinforcing relationship with the cooperative economy. I pointed out different limits of P2P theory. First, it tends to overestimate the emancipatory potential of CBPP: CBPP, I argue, is certainly *part of* the solution but it might not be *the* solution. A commons-based alternative to capitalism requires stable organisations (administrations) and cannot uniquely rely on loose, permission-less, online collaboration between individuals. P2P theory also calls on the cooperative economy but overestimates its transformative force. It promotes an exit from the capitalist technosystem and the construction – *alongside* – of a commons-based technosystem. Yet, it is hard to imagine capitalism can be

challenged only from the outside, without a more direct form of expropriation. Furthermore, P2P theory adopts a Marxist grid of analysis of macro-historical changes which is flawed since it extrapolates to all human history and to the future a model of social change that only occurred once, when bourgeois revolutions raised to legality the capitalist relations of production which progressively developed within feudal society. In its P2P version, the Marxist narrative leads to an unconvincing reformist argument: the objective conditions for a revolution are not ready yet, what matters today is the gradual development of the new mode of production.

The perspective of Michael Hardt and Antonio Negri is revolutionary and critical constructivist. It sees a contradiction between the development of biopolitical forces of production and capitalist relations of production. They claim that biopolitical labour tends to self-organize autonomously, while capitalist exploitation is increasingly taking the form of an *a posteriori* capture of the value it generates. Capitalist control over labour would have regressed from real to formal subsumption; thus, labour should now engage in an *exodus* to fully escape from the realm of capital. This theory of capitalist exploitation in the context of cognitive capitalism builds on Negri's interpretation of Marx's *Grundrisse*, but closely resembles Proudhon's understanding of exploitation as parasitism and theft. To the contrary, I have argued that capital still organizes the productive cooperation of the biopolitical workforce, that capitalist control over labour has not regressed to formal subsumption but progressed towards subjective subsumption. The development of biopolitical labour does not fundamentally contradict capitalist relations of production, it simply forced them to re-adapt and develop new managerial practices. Against this backdrop, the common consists in a complex or even confused notion encompassing nature (understood as the common wealth of humanity), the continuous self-production of society through interactions, and a new mode of production that develops within capitalism and may surpass it. The two philosophers reject both capitalism and socialism which they consider to be based on property and top-down control, whereas the common exceeds property and is fettered by hierarchical control. In their view, "what the private is to capitalism and what the public is to socialism, the common is to communism" (2009, p. 273). Like P2P theorists, they call for an exodus from the capitalist technosystem and the construction of a common-based technosystem. The increasing autonomy of the biopolitical workforce creates an opportunity but capitalism is not necessarily condemned: the surpassing of capitalism requires a revolution. Hardt and Negri's perspective is not techno-determinist but critical constructivist (A): for them, the main engine of historical and capitalist development resides in the subjectivity of class struggles rather than in objective economic or technological laws. A democratic alternative to capitalism would also have been possible before the advent of digital technologies. They are antitechnocratic (B) in that they forcefully criticize any form of social hierarchy, including those legitimated by reference to technoscientific expertise. However, they are significantly technophile (C): they criticize the way capital shapes technology but always call for its internal transformation rather than for its external limitation. They also associate emancipation to the endless development of productive forces and promote an alternative conception of economic growth.

The perspective of Jeremy Rifkin is strongly techno-determinist and apolitical. In his view, capitalism is ridden with an insurmountable contradiction: market competition constantly forces firms to increase productivity, which drives down marginal production costs, thus

commodity prices and profits. The logical conclusion of capitalist development thus appears to be an era of extreme productivity and material abundance where all products are nearly free and profits nearly fall to zero. The trend towards near zero marginal production costs would have already destabilised economic sectors selling information-intensive goods (e.g., music, film, edition, software) by allowing people to reproduce and share these goods for free on the web or to create their own amateur content as digital prosumers. Neglecting the rise of companies such as Netflix or Spotify that contradicts his diagnosis, Rifkin argues that this trend is accelerating and expanding to new economic sectors, especially renewable energies and 3D printing in manufacturing. He contends that the core contradiction of capitalism is about to be exacerbated by a new technology platform – the Internet of Things (IoT) – which will launch a third industrial revolution. According to him, great economic transformations occur in history when new technology platforms (composed of an energy regime and a communication system) are developed. Technology platforms would dictate the way the economy is organized and managed. The platforms of the first and second industrial revolutions intrinsically required vertically integrated firms, whereas the one of the third industrial revolution is intrinsically liberatory and democratic. Rifkin’s perspective fully dissolves the revolutionary element of Marxism in the deterministic one (debate A): class struggles are completely evacuated and history is quasi-exclusively shaped by the autonomous development of technology. It is very technophile (C) in that technological progress is presented as the only way to solve current social and environmental problems. Finally, as in the case of Marxism, the technophile technodeterminism of Rifkin legitimates technocracy (B): as long as elites develop the new technology platform, they necessarily serve the good of mankind.

The theory of the common as a political principle developed by Pierre Dardot and Christian Laval (2015) intends to answer a fundamental question of political theory: what is the foundation of political obligation? Given that every society needs rules, what commands respect to collective rules and laws? The principle of the common states that “*obligation only exists between those who participate in the same activity or the same task*” (ibid, p. 23). The common is a political principle in that it represents a beginning, a foundation that orders and governs all subsequent political activity. It is even the principle of politics itself, understood as the explicit and lucid activity through which men collectively determine what is just, as well as the decision and action proceeding from this activity. Political obligation is thus founded upon a collective activity of deliberation and decision-making regarding justice, in which every person can participate on an equal footing. Obligation is based on co-activity rather than mere belonging to a cultural or ethnic group, a nation or even mankind as a whole: the common derives from activity, not from being. The common is not the common good (that is, the just): the real search for the just necessitates common deliberative activity. Since obligation is founded upon co-activity, its origin cannot be attributed to a source which is extra-social or even external to the common deliberative activity of those it applies to (e.g., nature, gods, ancestors, laws of history, laws of the market).

Commons refer to the institutional arrangements in which the collective activity of individuals takes in charge diverse objects in accordance with the principle of the common. A commons is not simply an object but also its relation to the collective subject which emerges when individuals gather to institute and govern it as a commons through the co-production of rules.

Only the practical co-activity of putting in common (commoning) can institute an object as a commons. In addition, the common is the principle of a new law – the law of the common – which must be instituted against an old law – the law of property. The commons should not be conceived and instituted as a fragmentation and collectivisation of property, but as the creation of new use rights beyond and against the realm of property. Commons evade property because they are not only nor primarily shared goods, but institutions of self-government dedicated to the collective use of goods. The unappropriability of a commons does not only concern the resource it contains but foremost the collective activity that takes it in charge. Commons should break with the object-subject polarity founding the notion of property. The notion of use involved in commons contrasts with the idea of consumption and comes close to care, preservation and guardianship. It is an administrative use through which individuals co-deliberate to produce non-state juridical norms. The primacy of the common does not imply the abolition of private property nor that of the market, only their subordination to commons through the subtraction of certain objects from the realm of market exchange. However, it calls for the surpassing of the private and even the collective property over the means of production. Defining socialism as the collective property over the means of production was a major historical mistake made by the workers movement. The notion of property always comes with the idea of exclusion (excluding those who do not belong to the proprietary community) and the idea of planification (the owner commands what the production unit will execute). The latter founds co-obligation on property rather than co-activity and encourages the dissociation of command (located in the hands of the proprietary subject) and execution (to which the activity of the reified workers is reduced). As we have seen²⁰⁶, Benoit Borrits developed a concrete institutional proposal translating literally the ambition to surpass the property over the means of production in economic terms, by proposing to finance the assets of self-managed enterprises (productive commons) through debt.

Dardot and Laval developed the notion of instituting praxis to describe the type of practices required to institute the law of the common and the commons. Instituting praxis consists in the self-production of a collective subject in and through collective action, and especially, in and through the continued co-production of juridical rules. Collective action takes place in given conditions but also creates new conditions and simultaneously alters the subjectivity of the actors, thereby producing a new collective subject. The notion also implies that the instituting activity must be pursued after the initial act of institution, to avoid the tendency of institutions to become inert and autonomous realities escaping the effective activity of men. Instituting praxis generally acts below the regulations of official laws enforced by the state and, if necessary, against them. Ultimately, a revolution should enable the law of the common to leave the shadow and become a *de jure* law. The revolution should be understood as a moment of intensification and acceleration of instituting praxis, as “a change in some of society’s central institutions by the activity of that society itself: the explicit self-transformation of society, condensed in a short span of time” (Castoriadis 2005). In the absence of a revolution, it can be strategic to struggle for an official recognition of some *de facto* rules established by instituting praxis or for some creative use of existing laws in favour of the emergence of a law of the common (e.g., Richard Stallman and the GPL). Conquering existing political institutions

²⁰⁶ See Chapter 3, “Envisioning an economy of the commons beyond property”.

through elections can also be a means to push forward revolutionary reforms attacking the centrality of property and to govern against the centralized logic of the state.

The theory of the common as a political principle is anti-statist but does not aim for the destruction of the state. Rather, it aims to “relativise the state level, from below and from above [...] to reinforce local forms of self-organisation and to work at a supranational level towards another political organization of the world” (Dardot and Laval 2014). It envisions the institution of a double federation which would gather and organize from the local to the global level, the multiple commons composing the social-economic sphere (equivalent to the *agora*) on the one hand and the multiple communes composing the political sphere (equivalent to the *ecclesia*) on the other. The two theorists do not conceive the common as a third sector getting by in the socio-economic sphere between the state-market or public-private dualism, but as a general principle which should inspire the refoundation of the socio-economic and the political sphere.

The theory of the common as a political principle presents multiple advantages. It makes explicit a general principle underlying multiple struggles against neoliberal capitalism that developed since the 1990’s, enables to grasp their meaning and show how they could crystallize into a re-foundation of political and economic institutions. By this means, it can reinforce them and stimulate their association. It provides a single principle to institute a double federation aiming to surpass the ancient dualism between *imperium* and *dominium*, sovereignty and property, public and private law, the state and the market. It points out that the idea of collective property has dramatically deteriorated socialist ideals and practices and explores the ways to overcome any form of property. Foremost, by abandoning the Marxist theory of history and adopting Castoriadis’ social ontology as an alternative, it can support an emancipatory conception of the relation between politics and technology. It fully escapes the techno-determinism, technocratic implications, and techno-philia associated to the Marxist theory of history. Instead, it allows to promote critical constructivism (A), epistemic democracy (B), and technological sobriety (C). To that end, I highlighted the riches of Castoriadis’ approach to technology, proposed to combine it with elements of Andrew Feenberg’s philosophy, and to introduce an argument in favour of techno-economic degrowth.

Following Castoriadis, I consider technological development should be understood as a dimension of the imaginary institution of society and technology as a social institution among others. Science and technology studies (STS) have shown that technological development is underdetermined by technical criteria and is thus necessarily biased by the conflicting interests and worldviews composing the social world. Following Feenberg, I recognized that technological rationality has no extra-social essence but cannot either be reduced to the multiplicity of its empirical manifestations. Therefore, I chose to adopt his historical concept of technology’s essence combining both sociological and philosophical approaches: technical principles can be formulated in the abstract but necessarily get flooded with social interests and worldviews as they get realized in the real world. From this perspective, it appears that the formal bias of technology should both be approached at a micro-sociological level (social meaning) and a macro-sociological level (cultural horizon). The latter enables to give a critical content to constructivism by considering the importance of macro-social structures that are not directly observable as such (e.g., class domination). Furthermore, the concept of technosystem

allows to simultaneously address the technologies, markets and administrations that structure modern societies and support the coordination of countless specialized activities and knowledge dispersed across the globe. Markets and administrations are comparable to technologies not only since they are coordination media, but also because they contain formal bias: they are based on abstract rational principles that become biased each time they are realized in a particular social context.

Technology, as any social institution, has a certain inertia once established and tends to autonomize, to escape society's control. The explicit and lucid self-institution of society should thus be extended to the technical sphere. That is the meaning of Feenberg's notion of democratic rationalization; defined as public interventions in the technical sphere that contest technocratic power structures. The aim is not to deny the distinction between values and facts and to discredit the importance of specialized technical knowledge. Rather, it is to establish a constructive dialogue between laymen and experts that allows to democratically express the values that should be translated in technical terms. Reciprocally, technical experts can intervene in the political sphere, but their specialized knowledge should elevate the debate rather than close it.

The theory of the common as a political principle fits with an emancipatory perspective aiming for a radical internal transformation of the technosystem as well as its size-reduction (limiting the scope of technical manipulation, administrative control, and commodity exchange). It calls for the re-appropriation (destination) of the means of production towards democratically defined ends. It calls to surpass the property over the means over production and democratize their administration by turning enterprises into productive commons. The post-capitalist transformation of the technosystem is the necessary condition for its voluntary downscaling. The sufficient condition is the political choice to live with enough and squander the surplus from production rather than constantly reinvesting it to increase the common productive capabilities. That choice only becomes possible once one recognizes that social emancipation is distinct from the endless development of productive forces.

References

- Aglietta, Michel. 1999. 'Les Transformations Du Capitalisme Contemporain'. In *Capitalisme et Socialisme En Perspective. Évolution et Transformation Des Systèmes Économiques*,.
- Aguiton, Sara Angeli. 2015a. 'De La Quête d'efficacité En Contexte Participatif: La Démocratie Technique et Ses Contestations'. *Hermes, La Revue* (3): 90–97.
- . 2015b. 'De La Quête d'efficacité En Contexte Participatif: La Démocratie Technique et Ses Contestations'. *Hermes, La Revue* (3): 90–97.
- Aigrain, Philippe. 2003. 'Pour une coalition des biens communs'. *Libération.fr*.
https://www.liberation.fr/societe/2003/08/25/pour-une-coalition-des-biens-communs_442777
(September 24, 2020).
- Alchian, Armen A., and Harold Demsetz. 1973. 'The Property Right Paradigm'. *The journal of economic history*: 16–27.
- Allen, Robert C. 1982. 'The Efficiency and Distributional Consequences of Eighteenth Century Enclosures'. *The Economic Journal* 92(368): 937–53.
- Anderson, Chris. 2012. *Makers: The New Industrial Revolution*. Random House.
- Arendt, Hannah. 1958a. *The Human Condition*. University of Chicago Press.
- . 1958b. 'Totalitarian Imperialism: Reflections on the Hungarian Revolution'. *The journal of politics* 20(1): 5–43.
- . 1961. *Between Past and Future*. New York: The Viking Press.
- . 1963. *On Revolution*. Penguin Books.
- Aristote. 2004. *Ethique à Nicomaque*. Flammarion.
- . 2015. *Les Politiques*. Flammarion.
- Article 544 - Code Civil - Légifrance. 1804.
https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000006428859/ (March 29, 2021).
- Barbrook, Richard. 1998. 'The Hi-Tech Gift Economy'. *first monday*.
- Barbrook, Richard, and Andy Cameron. 1996. 'The Californian Ideology'. *Science as Culture* 6(1): 44–72.
- Barlow, John Perry. 1996. 'A Declaration of the Independence of Cyberspace'. *Electronic Frontier Foundation*. <https://www.eff.org/cyberspace-independence> (September 15, 2020).
- Baumol, William J. 1967. 'Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis'. *The American economic review* 57(3): 415–26.
- Bauwens, Michel. 2005. 'The Political Economy of Peer Production'. *CTheory*: 12–1.

- Bauwens, Michel, and Vasilis Kostakis. 2014. 'From the Communism of Capital to Capital for the Commons: Towards an Open Co-Operativism'. *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 12(1): 356–61.
- Bauwens, Michel, Vasilis Kostakis, and Alex Pazaitis. 2019. *Peer to Peer: The Commons Manifesto*. University of Westminster Press.
- Bauwens, Michel, and Jean Lievens. 2015. *Sauver Le Monde: Vers Une Économie Post-Capitaliste Avec Le Peer-to-Peer*. Éditions Les Liens qui libèrent.
- Becker, Gary S. 1968. 'Crime and Punishment: An Economic Approach'. In *The Economic Dimensions of Crime*, Springer, 13–68.
- Benkler, Yochai. 2006. *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. Yale University Press.
- . 2011. *The Penguin and the Leviathan: How Cooperation Triumphs over Self-Interest*. Currency.
- . 2019a. 'A Political Economy of Utopia?' *Duke Law & Technology Review* 18(1): 78–84.
- . 2019b. 'Power and Productivity: Institutions, Ideology, and Technology in Political Economy'. *Ideology, and Technology in Political Economy (December 14, 2019)*.
- Benkler, Yochai, Robert Faris, and Hal Roberts. 2018. *Network Propaganda: Manipulation, Disinformation, and Radicalization in American Politics*. Oxford University Press.
- Bensaïd, Daniel. 'Politiques de Castoriadis. Castoriadis corrige Marx ? – CONTRETEMPS'. <https://www.contretemps.eu/politiques-de-castoriadis/> (July 23, 2020).
- Benveniste, Émile. 1969. *Le Vocabulaire Des Institutions Indo-Européennes/1 Économie, Parenté, Société*. Éd. de Minuit.
- Berlin, Isaiah. 1959. 31 *Two Concepts of Liberty: An Inaugural Lecture Delivered before the University of Oxford on 31 October 1958*. Oxford: clarendon.
- Berrebi-Hoffmann, Isabelle, Marie-Christine Bureau, and Michel Lallement. 2018. *Makers-Enquête Sur Les Laboratoires Du Changement Social*. Le Seuil.
- Bijker, Wiebe E. 1995. *Of Bicycles, Bakelites and Bulbs. Toward a Theory of Sociotechnological Change*. Cambridge, MA: MIT Press.
- Bijker, Wiebe E., Thomas Parke Hughes, and Trevor J. Pinch. 1987. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT press.
- Bimber, Bruce. 1990. 'Karl Marx and the Three Faces of Technological Determinism'. *Social studies of science* 20(2): 333–51.
- Birch, Kean. 2016. 'Legitimizing Corporate Monopoly, Reproducing Neoliberalism?' *Handbook of Neoliberalism*: 320.
- Blackstone, William. 1766. *Commentaries on the Laws of England. Book II: Of the Right of Things*. Oxford University Press.
- Bloomberg News. 2013. 'China's New Leaders Burnish Image by Revealing Personal Details - Businessweek'.

- <https://web.archive.org/web/20130602190520/http://www.businessweek.com/news/2012-12-24/china-s-new-leaders-burnish-image-by-revealing-personal-details> (October 13, 2021).
- Boittiaux, Pascaline. 2017. 'Infographie: Google et Facebook dominant la publicité'. *Statista Infographies*. <https://fr.statista.com/infographie/12182/google-et-facebook-dominent-la-publicite/> (December 30, 2020).
- Bollier, David. 2007. 'The Growth of the Commons Paradigm'. *Understanding knowledge as a commons: From theory to practice* 27: 29.
- . 2014. *202 La Renaissance Des Communs: Pour Une Société de Coopération et de Partage*. ECLM.
- Boltanski, Luc, and Ève Chiapello. 1999. *Le Nouvel Esprit Du Capitalisme*. Gallimard.
- Botsman, Rachel. 2017. 'Big Data Meets Big Brother as China Moves to Rate Its Citizens'. *Wired UK*. <https://www.wired.co.uk/article/chinese-government-social-credit-score-privacy-invasion> (September 15, 2020).
- Bourg, Dominique. 2006. 'Technique'. In *Dictionnaire d'histoire et Philosophie Des Sciences*,.
- Bourreau, Marc, and Anne Perrot. 2020. 'Plateformes Numériques: Réguler Avant Qu'il Ne Soit Trop Tard'. *Notes du conseil danalyse economique* (6): 1–12.
- Bowers, Simon. 2016. 'Uber's Main UK Business Paid Only £411,000 in Tax Last Year'. *The Guardian*. <http://www.theguardian.com/business/2016/oct/10/ubers-main-uk-business-paid-only-411000-in-tax-last-year> (December 26, 2020).
- Bowyer, Adrian. 2004. 'Wealth Without Money - RepRap'. https://reprap.org/wiki/Wealth_Without_Money (June 10, 2021).
- Boyle, James. 2003. 'The Second Enclosure Movement and the Construction of the Public Domain'. *Law and contemporary problems* 66(1/2): 33–74.
- . 2008. *The Public Domain: Enclosing the Commons of the Mind*. New Haven, Conn.; London: Yale University Press, 2008.
- Brennen, J. Scott, and Daniel Kreiss. 2016. 'Digitalization'. In *The International Encyclopedia of Communication Theory and Philosophy*, American Cancer Society, 1–11. <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118766804.wbiect111> (September 15, 2020).
- Briatte, François. 2007. 'Un Stigmate Épistémologique. Le Relativisme Dans Le Strong Programme de David Bloor (Note)'. *Tracés. Revue de sciences humaines* (12): 207–13.
- Broca, Sébastien. 2012. 'L'utopie Du Logiciel Libre. La Construction de Projets de Transformation Sociale En Lien Avec Le Mouvement Du Free Software.' PhD Thesis.
- . 2013. *Utopie Du Logiciel Libre. Du Bricolage Informatique à La Réinvention Sociale*. Le passager clandestin.
- Broca, Sebastien. 2015. 'Les Deux Critiques Du Capitalisme Numérique'.
- Broca, Sébastien. 2016. 'Épistémologie Du Code et Imaginaire Des «SHS 2.0»'. *Variations. Revue internationale de théorie critique* (19).
- . 2017. 'Le Digital Labour, Extension Infinie Ou Fin Du Travail?' *Tracés. Revue de sciences humaines* (32): 133–44.

- Broca, Sebastien. 2020. 'Communs et Capitalisme Numériques: Histoire d'un Antagonisme et de Quelques Affinités Électives'.
- Broca, Sébastien, and Benjamin Coriat. 2015. 'Le Logiciel Libre et Les Communs'. *Revue internationale de droit économique* 29(3): 265–84.
- Brown, Wendy. 2003. 'Neo-Liberalism and the End of Liberal Democracy'. *Theory & Event* 7(1).
- . 2006. 'American Nightmare: Neoliberalism, Neoconservatism, and de-Democratization'. *Political theory* 34(6): 690–714.
- Buck, Susan J. 1998. *The Global Commons: An Introduction*. Island Press.
- Caffentzis, George. 2013. 'From the Grundrisse to Capital and beyond: Then and Now'. In *In Marx's Laboratory*, Brill, 265–81.
- calimaq. 2011. 'Non Arianna, le Huffington Post n'est pas Wikipédia !' - *S.I.Lex* -. <https://scinfolex.com/2011/10/16/non-arianna-le-huffington-post-nest-pas-wikipedia/> (January 20, 2021).
- Cambridge Dictionary. 'HACKER |'. <https://dictionary.cambridge.org/fr/dictionnaire/anglais/hacker> (October 21, 2020).
- Carballa Smichowski, Bruno, and Benjamin Coriat. 2017. 'Communs et Economie Collaborative Jalons Pour Une Définition'. <http://encommuns.com/> (December 23, 2020).
- Cardan, Paul. 1964. 'Le Rôle de l'idéologie Bolchévique Dans La Naissance de La Bureaucratie'. *Socialisme ou Barbarie* (35).
- Casilli, Antonio. 2015a. *Digital Labor: Travail, Technologies et Conflictualités*.
- . 2015b. 'Poster sur Facebook, c'est travailler. Comment nous rémunérer ?' *Libération*. https://www.liberation.fr/futurs/2015/09/11/antonio-casilli-poster-sur-facebook-c-est-travailler-comment-nous-remunerer_1380647/ (February 3, 2021).
- Castoriadis, Cornelius. 1975. 336 *L'institution Imaginaire de La Société*. Seuil Paris.
- . 1979. 'Autogestion et Hiérarchie'. *Editions grain de sable. Extrait de Le contenu du socialisme, Paris: Éditions*.
- . 1980. 'TECHNIQUE'. *Encyclopædia Universalis*. <https://www.universalis.fr/encyclopedie/technique/> (July 23, 2020).
- . 1986. 'La Polis Grecque et La Création de La Démocratie'. *Domaines de l'homme* 287.
- . 1988. 'On the Content of Socialism II'. In *Political and Social Writings. Vol. 2*, Minneapolis: University of Minnesota Press.
- . 1989. Autonomie et autotransformation de la société *Fait et à faire*. Librairie Droz. <https://www.cairn.info/autonomie-et-autotransformation-de-la-societe--9782600041256-page-457.htm> (July 23, 2020).
- . 1996. 'La Démocratie Comme Procédure et Comme Régime'. *La montée de l'insignifiance* 4: 221–41.
- . 1999. *Démocratie et Relativisme Entretiens Avec Le MAUSS*. <https://livre.fnac.com/a2776539/Cornelius-Castoriadis-Democratie-et-relativisme> (July 23, 2020).

- Céline, Louis-Ferdinand. 1932. *Voyage Au Bout de La Nuit*. Ebooks libres et gratuits.
- de Certeau, Michel. 1980. *L'invention Du Quotidien (Vol. 1)*. Paris: UGE.
- Cervera-Marzal, Manuel. 2012. 'Penser Le Conflit Avec, Ou sans, Karl Marx ? Une Querelle de Famille Entre Mouffe, Lefort, Castoriadis et Abensour | Revue Du Mauss Permanente'. *Revue du MAUSS*. <http://www.journaldumauss.net/?Penser-le-conflit-avec-ou-sans> (July 23, 2020).
- Chanteau, Jean-Pierre, and Agnès Labrousse. 2013. 'L'institutionnalisme Méthodologique d'Elinor Ostrom: Quelques Enjeux et Controverses'. *Revue de la régulation. Capitalisme, institutions, pouvoirs* (14).
- Charbonneau, Bernard. 2001. *Prométhée Réenchaîné*. La Table Ronde.
- Charbonnier, Pierre. 2015. 'Jacques Ellul Ou l'écologie Contre La Modernité'. *Ecologie politique* (1): 127–46.
- Chaulieu, Pierre. 1949. 'Les Rapports de Production En Russie'. *Socialisme ou Barbarie* (2).
———. 1955. 'Sur Le Contenu Du Socialisme'. *Socialisme ou Barbarie* (17).
- Chédin, Maxime. 2018. 'La ZAD et le Colibri : deux écologies irréconciliables ?' *Terrestres*. <https://www.terrestres.org/2018/11/15/la-zad-et-le-colibri-deux-ecologies-irreconciliables/> (January 24, 2021).
———. 'La ZAD et Le Colibri : Deux Écologies Irréconciliables ?' *Terrestres 2*: Novembre 2018.
- Clastres, Pierre. 1974. *La Société Contre l'Etat*. Editions de Minuit.
- Clerc, Denis, and Dominique Méda. 2009. 'Emploi et Travail Chez André Gorz'. In *André Gorz, Un Penseur Pour Le XXIe Siècle*, , 99–122.
- Coase, Ronald Harry. 1937. 'The Nature of the Firm'. In *Essential Readings in Economics*, Springer, 37–54.
- Cohen, Julie E. 2019. *Between Truth and Power: The Legal Constructions of Informational Capitalism*. Oxford University Press, USA.
- Coleman, Biela, and Mako Hill. 2004. 'How Free Became Open and Everything Else under the Sun'. *M/C: A Journal of Media and Culture* 7(3).
- Coleman, Gabriella. 2004. 'The Political Agnosticism of Free and Open Source Software and the Inadvertent Politics of Contrast'. *Anthropological Quarterly* 77(3): 507–19.
- Comité Invisible. 2017. *Maintenant*. La Fabrique éditions.
- Coutrot, Thomas. 2002. 'Socialisme, Marchés Autogestion: Un État Du Débat'. *Séminaire Matisse Hétérodoxies*.
- D'Alisa, Giacomo, Federico Demaria, and Giorgos Kallis. 2014. *Degrowth: A Vocabulary for a New Era*. Routledge.
- Dardot, Pierre, and Christian Laval. 2007. 'La nature du néolibéralisme : un enjeu théorique et politique pour la gauche'. *Mouvements* n° 50(2): 108–17.
———. 2010a. *La nouvelle raison du monde*. La Découverte. <https://www-cairn-info.acces-distant.sciencespo.fr/la-nouvelle-raison-du-monde--9782707165022.htm?WT.tsrc=cairnSearchAutocomplete> (July 23, 2020).

- . 2010b. 'Néolibéralisme et Subjectivation Capitaliste'. *Cités* (1): 35–50.
- . 2015. *Commun.* La Découverte. <https://www-cairn-info.acces-distant.sciencespo.fr/commun--9782707186737.htm> (July 23, 2020).
- Deleuze, Gilles. 1990. 'Post-Scriptum Sur Les Sociétés de Contrôle'. In *Pourparlers*,.
- Denord, François, Rachel Knaebel, and Pierre Rimbert. 2015. 'L'ordolibéralisme allemand, cage de fer pour le Vieux Continent'. *Le Monde diplomatique*. <https://www.monde-diplomatique.fr/2015/08/DENORD/53518> (January 25, 2021).
- Devine, Pat. 2019. 'Marx, la démocratie et la planification économique'. *Actuel Marx* n° 65(1): 54–66.
- Dockès, Pierre. 1993. 'Les recettes fordistes et les marmites de l'histoire : (1907-1993)'. *Revue économique* 44(3): 485–528.
- . 2003. 'Métacapitalisme et Transformations de l'ordre Productif'. In *Sommes-Nous Sortis Du Capitalisme Industriel?*,.
- Doctorow, Cory. 2010. 'Why I Won't Buy an iPad (and Think You Shouldn't, Either)'. *Boing Boing*. <https://boingboing.net/2010/04/02/why-i-wont-buy-an-ipad-and-thi.html> (November 14, 2020).
- Dubois, Michel. 2002a. 'Les enjeux philosophiques et sociologiques d'une redéfinition actionniste de la « construction sociale » des sciences'. *Revue européenne des sciences sociales. European Journal of Social Sciences* (XL–124): 185–98.
- . 2002b. 'Les Enjeux Philosophiques et Sociologiques d'une Redéfinition Actionniste de La «construction Sociale» Des Sciences'. *Revue européenne des sciences sociales. European Journal of Social Sciences* (XL–124): 185–98.
- Dulong de Rosnay, Mélanie. 2019. 'Commonswashing by Information Technologies and Online Platforms, the Semantic Appropriation of the Commons'. *Netcommons*. <https://netcommons.eu/index.html%3Fq=content%252Fcommonswashing-information-technologies-and-online-platforms-semantic-appropriation-commons.html> (February 18, 2021).
- Dupuis-Déri, Francis. 2004. 'The Political Power of Words: The Birth of Pro-Democratic Discourse in the Nineteenth Century in the United States and France'. *Political Studies* 52(1): 118–34.
- Dusek, Val. 2006. *Philosophy of Technology: An Introduction*. Blackwell Publishing.
- Ecologist. 1993. *Whose Common Future: Reclaiming the Commons*. New Society Publishers.
- Eghbal, Nadia. 2016. 'The Unseen Labor Behind Our Digital Infrastructure'. : 143.
- Ellul, Jacques. 1954. *La Technique Ou l'enjeu Du Siècle*. Armand Colin.
- . 1977. *Le Système Technicien*. Cherche Midi.
- . 1982. *Changer de révolution*. Le Seuil. <https://www-cairn-info.acces-distant.sciencespo.fr/changer-de-revolution--9782020061193.htm> (July 23, 2020).
- . 1988. *Le Bluff Technologique*. Hachette.
- Engels, Friedrich. 1872. 'On Authority'. *The Marx-Engels Reader* 2.

- Esping-Andersen, Gosta. 1990. *The Three Worlds of Welfare Capitalism*. Princeton University Press.
- Federici, Silvia. 2018. 'Marx and Feminism'. *TripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 16(2): 468–75.
- Feenberg, Andrew. 1992. 'Subversive Rationalization: Technology, Power, and Democracy'. *Inquiry* 35(3–4): 301–22.
- . 1996. 'Marcuse or Habermas: Two Critiques of Technology'. *Inquiry* 39(1): 45–70.
- . 1999. *Questioning Technology*. Routledge.
- . 2010. *Between Reason and Experience: Essays in Technology and Modernity*. MIT Press.
- . 2017. *Technosystem*. Harvard University Press.
- Fisher, Eran, and Christian Fuchs, eds. 2015. *Reconsidering Value and Labour in the Digital Age*. London: Palgrave Macmillan UK. <http://link.springer.com/10.1057/9781137478573> (July 23, 2020).
- Flichy, Patrice. 2013. *Traité de sociologie économique 13. Comment Internet est devenu un marché*. Presses Universitaires de France. <https://www.cairn.info/traite-de-sociologie-economique--9782130608318-page-479.htm> (September 24, 2020).
- Foucault, Michel. 1979. *Naissance de La Biopolitique: Cours Au Collège de France (1978-1979)*. Gallimard Seuil.
- Friedman, Milton. 2002. *Capitalism and Freedom: Fortieth Anniversary Edition*. University of Chicago Press.
- Fuchs, Christian. 2010. 'Labor in Informational Capitalism and on the Internet'. *The Information Society* 26(3): 179–96.
- . 2014. *Digital Labour and Karl Marx*. Routledge.
- Gadrey, Jean. 2013. 'Jeremy Rifkin, le gourou du gotha européen (1) | Debout ! | Jean Gadrey | Les blogs d'Alternatives Économiques'. *blogs.alternatives-economiques.fr*. <http://blogs.alternatives-economiques.fr/gadrey/2013/05/09/jeremy-rifkin-le-gourou-du-gotha-europeen-1> (October 14, 2021).
- Gardels, Nathan. 2015. 'China's New Five-Year Plan Embraces the Third Industrial Revolution'. *HuffPost*. https://www.huffpost.com/entry/china-third-industrial-revolution_b_8478954 (October 13, 2021).
- Gates, Bill. 1976. 'An Open Letter to Hobbyists'. *Homebrew Computer Club Newsletter* 2(1): 2.
- Giuliani, Alfonso, and Carlo Vercellone. 2019. 'From New Institutional Economics of the Commons to the Common as a Mode of Production'. *South Atlantic Quarterly* 118(4): 767–87.
- Global Footprint Network. 2021. 'Open Data Platform'. <https://data.footprintnetwork.org/#/> (February 18, 2021).
- gnu.org. 'Proprietary Surveillance'. <https://www.gnu.org/proprietary/proprietary-surveillance.en.html> (November 13, 2020a).

- . ‘What Is Free Software?’ <https://www.gnu.org/philosophy/free-sw.en.html> (September 23, 2020b).
- Godin, Romaric. 2019. ‘Crises Sociales, Crises Démocratiques, Crise Du Néolibéralisme’. *Mediapart*.
- Gorz, André. 1964. *Stratégie Ouvrière et Néocapitalisme*. Paris: Éditions du Seuil.
- . 1973. *Critique de La Division Du Travail*. éd. du seuil.
- . 1974. ‘Leur Écologie et La Nôtre’. *Le Sauvage*.
- . 1980. *Adieux Au Prolétariat*. Galilée.
- . 1988. *441 Métamorphoses Du Travail: Quête Du Sens, Critique de La Raison Économique*. Editions Galilée.
- . 1991. *Capitalisme, Socialisme, Écologie: Désorientations, Orientations*. Galilée.
- . 2002. ‘Pour Un Revenu Inconditionnel Suffisant’. *Transversales/Science-Culture* (3).
- . 2003. *L’immatériel: Connaissance, Valeur et Capital*. Ed. Galilée.
- . 2007a. *Ecologica*. Galilée.
- . 2007b. ‘La Sortie Du Capitalisme a Déjà Commencé’.
- . 2007c. ‘Le Travail Dans La Sortie Du Capitalisme’. *Ecorev - Revue Critique d’Ecologie Politique* (28). <http://www.ecorev.org/spip.php?article641> (November 13, 2020).
- Graeber, David. 2002. ‘The New Anarchists’. *New left review* 13(6): 61–73.
- Granjon, Fabien. 2001. ‘Mouvement «anti-Mondialisation» et Dispositifs de Communication Sur Réseaux’. In *Colloque Bagues*, , 137–54.
- . 2005. ‘L’Internet Militant. Entretien Avec Fabien Granjon’. *Matériaux pour l’histoire de notre temps* 79(1): 24–29.
- Gras, Alain. 1997. *Les Macro-Systèmes Techniques*. PUF.
- Greene, Thomas. 2001. ‘Ballmer: “Linux Is a Cancer”’. https://www.theregister.com/2001/06/02/ballmer_linux_is_a_cancer/ (September 30, 2020).
- Habermas, Jürgen. 1973. *La Technique et La Science Comme ‘Idéologie’*. Gallimard.
- . 1984. *The Theory of Communicative Action*. Boston: Beacon Press.
- Hacking, Ian, and Jan Hacking. 1999. *The Social Construction of What?* Harvard university press.
- Hardin, Garrett. 1968. ‘The Tragedy of the Commons’. *Science*.
- Hardt, Michael, and Antonio Negri. 2000. *Empire*. Harvard University Press.
- . 2004. *Multitude: War and Democracy in the Age of Empire*. Penguin.
- . 2009. *Commonwealth*. Harvard University Press.
- . 2017. *Assembly*. Oxford University Press.
- Harvey, David. 2004. ‘Le «Nouvel Impérialisme»: Accumulation Par Expropriation’. *Actuel Marx* (1): 71–90.

- . 2007. *A Brief History of Neoliberalism*. Oxford University Press, USA.
- . 2010. *A Companion to Marx's Capital*. Verso.
- . 2011. 'The Future of the Commons'. *Radical history review* 2011(109): 101–7.
- Hayek, Friedrich. 1944. *The Road to Serfdom*. Routledge.
- . 1988. *The Fatal Conceit: The Errors of Socialism*. London: Routledge.
- Heidegger, Martin. 1954. 'The Question Concerning Technology'. *Technology and values: Essential readings* 99: 113.
- Heilbroner, Robert. 1994. 'Technological Determinism Revisited'. *Does technology drive history* 1: 67–78.
- Heilbroner, Robert L. 1967. 'Do Machines Make History?' *Technology and culture* 8(3): 335–45.
- Hess, Charlotte, and Elinor Ostrom. 2003. 'Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource'. *Law and contemporary problems* 66(1/2): 111–45.
- . 2007a. 'A Framework for Analyzing the Knowledge Commons'.
- . 2007b. 'Introduction: An Overview of the Knowledge Commons'.
- Hickel, Jason, and Giorgos Kallis. 2020. 'Is Green Growth Possible?' *New political economy* 25(4): 469–86.
- Himanen, Pekka. 2001. *The Hacker Ethic*. Secker & Warburg.
- von Hippel, Eric. 2005. *Democratizing Innovation*. MIT Press. Cambridge.
- Howes, Jeff. 2006. 'The Rise of Crowdsourcing | WIRED'. *Wired*.
<https://www.wired.com/2006/06/crowds/> (December 23, 2020).
- Hughes, Thomas P. 1987. 'The Evolution of Large Technological Systems'. *The social construction of technological systems: New directions in the sociology and history of technology* 82.
- Huxley, Aldous. 1932. *Brave New World*. London: Vintage.
- Illich, Ivan. 1973. *Tools for Conviviality*. Harper&Row Publishers.
- Ippolita. 2009. 'Contre l'hégémonie de Google'. *Multitudes* n° 36(1): 62–70.
- Jackson, Tim. 2009. *Prosperity without Growth. Economics for a Finite Planet*. Routledge.
- Jardin, Xeni. 2005. 'Bill Gates: Free Culture Advocates = Commies'. *Boing Boing*.
<https://boingboing.net/2005/01/05/bill-gates-free-cult.html> (September 29, 2020).
- Jasanoff, Sheila, and Sang-Hyun Kim. 2015. *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*. University of Chicago Press.
- Jeanpierre, Laurent. 2019. *In Girum: Les Leçons Politiques Des Ronds-Points*. La découverte.
- Jensen, Michael C., and William H. Meckling. 1976. 'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure'. *Journal of financial economics* 3(4): 305–60.

- Jouventin, Pierre, and Serge Latouche. 2019. ‘« L’homme peut-il se reconvertir de prédateur en jardinier ? »’. *Le Monde.fr*. https://www.lemonde.fr/idees/article/2019/07/29/l-homme-peut-il-se-reconvertir-de-predateur-en-jardinier_5494523_3232.html (January 24, 2021).
- Kallis, Giorgos. 2015a. ‘Is There a Growth Imperative in Capitalism? A Commentary on John Bellamy Foster’. *Undisciplined Minds*.
- . 2015b. ‘The Degrowth Alternative’. *Great Transition Initiative*: 1–6.
- . 2018. ‘Research on Degrowth’. *Annual Review of Environment and Resources* 43: 291–316.
- . 2019. ‘Socialism without Growth’. *Capitalism Nature Socialism* 30(2): 189–206.
- Kallis, Giorgos, and Erik Swyngedouw. 2018. ‘Do Bees Produce Value? A Conversation between an Ecological Economist and a Marxist Geographer’. *Capitalism Nature Socialism* 29(3): 36–50.
- Karatani, Kojin. 2014. *The Structure of World History*. Duke University Press.
- Keay, Douglas. 1987. ‘Interview of Margaret Thatcher’. *Woman’s Own*.
- Kenney, Martin, and John Zysman. 2019. ‘Work and Value Creation in the Platform Economy’. In *Work and Labor in the Digital Age*, Emerald Publishing Limited.
- ‘Kernel Patch Statistic’. http://www.remword.com/kps_result/ (October 4, 2020).
- Klein, Naomi. 2020. ‘Screen New Deal: Under Cover of Mass Death, Andrew Cuomo Calls in the Billionaires to Build a High-Tech Dystopia’. *The Intercept*. <https://theintercept.com/2020/05/08/andrew-cuomo-eric-schmidt-coronavirus-tech-shock-doctrine/> (September 29, 2020).
- Kleiner, Dmytri. 2010. *The Telekommunist Manifesto*. Institute of Network Cultures Amsterdam.
- Kostakis, Vasilis, and Michel Bauwens. 2014. *Network Society and Future Scenarios for a Collaborative Economy*. Springer.
- Kostakis, Vasilis, Kostas Latoufis, Minas Liarokapis, and Michel Bauwens. 2018. ‘The Convergence of Digital Commons with Local Manufacturing from a Degrowth Perspective: Two Illustrative Cases’. *Journal of Cleaner Production* 197: 1684–93.
- Kostakis, Vasilis, Vasilis Niaros, George Dafermos, and Michel Bauwens. 2015. ‘Design Global, Manufacture Local: Exploring the Contours of an Emerging Productive Model’. *Futures* 73: 126–35.
- Latour, Bruno. 1991. *Nous n’avons Jamais Été Modernes. Essai d’anthropologie Symétrique*. La Découverte.
- . 1992. ‘10 “Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts”’.
- . 1999. *Pandora’s Hope: Essays on the Reality of Science Studies*. Harvard university press.
- . 2017. *Où Atterrir?: Comment s’Orienter En Politique*. La découverte.
- Lecourt, Dominique. 2006. *Dictionnaire d’histoire et Philosophie Des Sciences*.
- Lemoine, Phillippe. 2014. *La Nouvelle Grammaire Du Succès. La Transformation Numérique de l’économie Française*. . Rapport au gouvernement.

- Lenin, Vladimir. 1918. *Left Wing Childishness and the Petty-Bourgeois Mentality*, *Selected Works*. Moscow: Progress Publishers.
- Leroi-Gourhan, André. 1964. *Le Geste et La Parole. Technique et Langage*. Albin Michel.
- Lessig, Lawrence. 2004. *Free Culture*. Independently published.
- Levine, Norman. 1973. 'Marxism and Engelism: Two Differing Views of History.' *Journal of the History of the Behavioral Sciences*.
- l'Humanité. 2020. *Thomas Piketty - Frédéric Lordon, Un Débat de Haut Vol Sur La Propriété*. <https://www.youtube.com/watch?v=dDY3aczWOd0&t=5359s> (July 8, 2021).
- Liogier, Raphaël. 2016. *Sans Emploi: Condition de l'homme Postindustriel*. Éditions Les liens qui libèrent.
- Locher, Fabien. 2013. 'Les Pâturages de La Guerre Froide: Garrett Hardin et La «Tragédie Des Communs»'. *Revue d'histoire moderne contemporaine* (1): 7–36.
- Lojkine, Ulysse. 2020. 'L'exploitation comme extraction. Examen critique d'une thèse post-opéraïste'. *Contretemps*. <https://www.contretemps.eu/exploitation-extraction-critique-negri/> (July 31, 2020).
- Lordon, Frédéric. 2010. *Capitalisme, Désir et Servitude: Marx et Spinoza*. La fabrique éditions.
- . 2018. 'Sortir Les Parasols Par Frédéric Lordon - [« Tout Le Monde Déteste Le Travail »]'. *lundimatin*. <https://lundi.am/Sortir-les-parasols> (July 31, 2020).
- . 2021. *Figures Du Communisme*. Fabrique (La).
- Lukàcs, George. 1922. *Histoire et Conscience de Classe. Essai de Dialectique Marxiste*. Paris: Editions de Minuit.
- Luxemburg, Rosa. 1900. *Réforme Sociale Ou Révolution*. Maspéro.
- . 1913. *L'Accumulation Du Capital (II) in Oeuvres IV*. Maspero.
- MacKinnon, Rebecca. 2011. 'Liberation Technology: China's "Networked Authoritarianism"'. *Journal of Democracy* 22(2): 32–46.
- Malet, Jean-Baptiste. 2018. 'Le Système Pierre Rabhi'. *Le Monde diplomatique* (8): 22–22.
- Mamère, Noël et al. 2014. '«La Troisième Révolution» de Rifkin n'aura pas lieu'. *Libération*. https://www.liberation.fr/terre/2014/10/21/la-troisieme-revolution-de-rifkin-n-aura-pas-lieu_1126521/ (October 14, 2021).
- Marcuse, Herbert. 1964. *One-Dimensional Man. Studies in the Ideology of Advanced Industrial Society*. Routledge Classics.
- . 1965. 'Industrialization and Capitalism'. *New Left Review* (30).
- Marsh, Leslie, and Christian Onof. 2008. 'Stigmergic Epistemology, Stigmergic Cognition'. *Cognitive Systems Research* 9(1): 136–49.
- Marx, Karl. 1842. 'Débats Sur La Loi Relative Au Vol Du Bois'. *Rheinische Zeitung*. https://www.marxists.org/francais/marx/works/1842/11/vol_de_bois.htm (February 10, 2021).
- . 1844a. *Manuscrits de 1844*. Flammarion.

- . 1844b. *Sur La Question Juive*. La fabrique éditions.
- . 1847. *The Poverty of Philosophy*. CH Kerr.
- . 1852. *The 18th Brumaire of Louis Bonaparte*. Wildside Press LLC.
- . 1857. *Grundrisse: Foundations of the Critique of Political Economy*. Penguin UK.
- . 1859. ‘Preface to a Contribution to the Critique of Political Economy’. In *The Marx-Engels Reader*, WW Norton New York, 3–6.
- . 1867a. *Capital. A Critique of Political Economy. Volume I*. First English Edition.
- . 1867b. *Le Capital. Livre 1*. Gallimard.
- . 1881. ‘Letter to Vera Zasulich’.
<https://www.marxists.org/archive/marx/works/1881/zasulich/reply.htm> (February 10, 2021).
- . 1882. ‘Communist Manifesto (Preface)’. In Russian Edition.
<https://www.marxists.org/archive/marx/works/1848/communist-manifesto/preface.htm#preface-1882> (February 10, 2021).
- Marx, Karl, and Friedrich Engels. 1845. 1 *The German Ideology*. International Publishers Co.
- Marx, Leo. 1994. ‘The Idea of “Technology” and Postmodern Pessimism’. In *Technology, Pessimism, and Postmodernism*, Springer, 11–28.
- . 1997. ‘Technology: The Emergence of a Hazardous Concept’. *Social Research*: 965–88.
- Marx, Leo, and Merritt Roe Smith. 1994. *Does Technology Drive History?: The Dilemma of Technological Determinism*. Mit Press.
- Marxists.org. ‘Glossary of Terms: Ne’. <https://www.marxists.org/glossary/terms/n/e.htm> (August 19, 2021).
- Mattei, Ugo. ‘First Thoughts for a Phenomenology of the Commons | The Wealth of the Commons’. <http://wealthofthecommons.org/essay/first-thoughts-phenomenology-commons> (November 2, 2021).
- Mckean, Margaret A. 1986. ‘Management of Traditional Common Lands (Iriaichi) in Japan. In Proceedings of the Conference on Common Property Resource Management, National Research Council, Washington’.
- Merton, Robert K. 1973. ‘“The Normative Structure of Science “(1942)’. In *The Sociology of Science*, , 267–78.
- Mitcham, Carl. 2004. ‘Philosophy of Information Technology’. *the Philosophy of Computing and Information*: 327.
- Morin, Edgar. 2007. *Où va Le Monde?* L’Herne.
- Morris, William. 1888. *A Dream of John Ball*. gutenber.org.
- Mossoff, Adam. 2005. ‘Is Copyright Property’. *San Diego L. Rev.* 42: 29.
- Mouffe, Chantal. 2018. *Pour Un Populisme de Gauche*. Albin Michel.
- Moulier-Boutang, Yann. 2009. ‘Place de La Toile’.
- . 2011. *Cognitive Capitalism*. Polity.

- Musgrave, Richard A. 1959. *The Theory of Public Finance; a Study in Public Economy*. Kogakusha Co.
- Negri, Antonio. 1978. *Marx Au-Delà de Marx; Cahiers de Travail Sur Les Grundrisse*. L'Harmattan.
- Noble, David F. 1995. *Progress without People: New Technology, Unemployment, and the Message of Resistance*. Between the Lines.
- Nordhaus, William D. 2006. NBER Working Papers *Baumol's Diseases: A Macroeconomic Perspective*. National Bureau of Economic Research, Inc. <https://ideas.repec.org/p/nbr/nberwo/12218.html> (September 7, 2021).
- Oldenburg, Ray. 1999. *The Great Good Place: Cafes, Coffee Shops, Bookstores, Bars, Hair Salons, and Other Hangouts at the Heart of a Community*. Da Capo Press.
- Olma, Sebastian. 2014. 'Never Mind the Sharing Economy: Here's Platform Capitalism'. A blog by Sebastian Olma. <https://networkcultures.org/sebastianolma/2014/10/16/never-mind-the-sharing-economy-heres-platform-capitalism/> (December 26, 2020).
- O'reilly, Tim. 2005. 'What Is Web 2.0-Design Pattern and Business Models for the Next Generation Software'. <http://www.oreillynet.com/lpt/a/6228>.
- Orsi, Fabienne. 2013. 'Elinor Ostrom et Les Faisceaux de Droits: L'ouverture d'un Nouvel Espace Pour Penser La Propriété Commune'. *Revue de la régulation. Capitalisme, institutions, pouvoirs* (14).
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge university press.
- Ostrom, Elinor, and Charlotte Hess. 2010. 'Private and Common Property Rights'. *Property law and economics* 5: 53.
- Ostrom, Vincent, and Elinor Ostrom. 1977. 'Public Goods and Public Choices'.
- Packer, George. 2014. 'Cheap Words | The New Yorker'. *The New Yorker*. <https://www.newyorker.com/magazine/2014/02/17/cheap-words> (January 19, 2021).
- Panzieri, Ranieri. 1961. 'Capitalisme et Machinisme'. *Quaderni Rossi* 1.
- Papadimitropoulos, Vangelis. 2017. 'The Politics of the Commons: Reform or Revolt?' *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 15(2): 563–81.
- . 2020. *The Commons. Economic Alternatives in the Digital Age*. London: University of Westminster Press.
- Piketty, Thomas. 2019. *Capital et Idéologie*. Seuil.
- Piore, Michael J. 1968. 'The Impact of the Labor Market upon the Design and Selection of Productive Techniques within the Manufacturing Plant'. *The Quarterly Journal of Economics* 82(4): 602–20.
- Polanyi, Karl. 1944. *The Great Transformation*. Farrar&Rinehart. New York.
- Prinz, Arthur M. 1969. 'Background and Ulterior Motive of Marx's "Preface" of 1859'. *Journal of the History of Ideas* 30(3): 437–50.

- Proudhon, Pierre-Joseph. 1840. *Qu'est-Ce Que La Propriété?* Hachette.
- . 1865. *De La Capacité Politique Des Classes Ouvrières*. E. Dentu.
- Proulx, Serge. 2017. 'L'injonction à Participer Au Monde Numérique'. *Communiquer. Revue de communication sociale et publique* (20): 15–27.
- Pushkarev, Sergei. 1970. *Dictionary of Russian Historical Terms from the Eleventh Century to 1917*.
- Rawls, John. 2001. *Justice as Fairness: A Restatement*. Harvard University Press.
- Raymond, Eric. 1999. 'The Cathedral and the Bazaar'. *Knowledge, Technology & Policy* 12(3): 23–49.
- Raymond, Eric, and al. 'Hacker'. *Jargon File*. <http://www.catb.org/jargon/html/H/hacker.html> (October 20, 2020).
- Reporterre. 2019. 'Bruno Latour : « Les Gilets jaunes sont des migrants de l'intérieur quittés par leur pays »'. *Reporterre, le quotidien de l'écologie*. <https://reporterre.net/Bruno-Latour-Les-Gilets-jaunes-sont-des-migrants-de-l-interieur-quittes-par> (January 24, 2021).
- Rey, Olivier. 2014. *Une Question de Taille*. Stock.
- Rifkin, Jeremy. 1995. *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*. ERIC.
- . 2001. *The Age of Access: The New Culture of Hypercapitalism*. Penguin.
- . 2014. *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism*. Palgrave Macmillan US.
- Ritzer, George, and Nathan Jurgenson. 2010. 'Production, Consumption, Prosumption: The Nature of Capitalism in the Age of the Digital "Prosumer"'. *Journal of consumer culture* 10(1): 13–36.
- Samuelson, Paul A. 1954. 'The Pure Theory of Public Expenditure'. *The review of economics and statistics* 36(4): 387–89.
- Save the Children. 2018. *Don't Push It*. <https://www.savethechildren.org.uk/content/dam/gb/reports/health/dont-push-it.pdf> (February 14, 2018).
- Schlager, Edella, and Elinor Ostrom. 1992. 'Property-Rights Regimes and Natural Resources: A Conceptual Analysis'. *Land economics*: 249–62.
- Scholz, Trebor. 2012. *Digital Labor: The Internet as Playground and Factory*. Routledge.
- Schwab, Klaus. 2017. *The Fourth Industrial Revolution*. Currency.
- Shiva, Vandana. 2001. *Protect or Plunder?: Understanding Intellectual Property Rights*. Zed Books.
- Söderberg, Johan. 2014. 'Reproducing Wealth without Money, One 3D Printer at a Time: The Cunning of Instrumental Reason'. *Journal of Peer Production* 4: 1–10.
- Spence, Crawford. 2011. 'Comptabiliser l'intellect Général'. *Multitudes* (3): 69–74.
- Srnicek, Nick. 2017. *Platform Capitalism*. John Wiley & Sons.

- Srnicek, Nick, and Alex Williams. 2015. *Inventing the Future: Postcapitalism and a World without Work*. Verso Books.
- Stallman, Richard. 1986. 'RMS Lecture at KTH'. <https://www.gnu.org/philosophy/stallman-kth.en.html> (November 20, 2020).
- . 'Did You Say "Intellectual Property"? It's a Seductive Mirage'. <https://www.gnu.org/philosophy/not-ipr.en.html> (November 22, 2020a).
- . 'On Hacking'. <https://stallman.org/articles/on-hacking.html> (October 22, 2020b).
- Stallman, Richard M. 2002. *Free Software, Free Society: Selected Essays*. 1st. ed. Boston, Mass: Free Software Foundation.
- Stallman, Richard M., Sam Williams, and Christophe Masutti. 2013. *Richard Stallman et La Révolution Du Logiciel Libre: Une Biographie Autorisée*. Editions Eyrolles.
- Stengers, Isabelle. 2013. *Au Temps Des Catastrophes: Résister à La Barbarie Qui Vient*. La découverte.
- Stiegler, Bernard. 2015. *La Société Automatique: 1. L'avenir Du Travail*. Fayard.
- Strum, Shirley, Michel Callon, Bruno Latour, and Madeleine Akrich. 2013. *Sociologie de La Traduction: Textes Fondateurs*. Presses des Mines via OpenEdition.
- Sultan, Frédéric. 2011. 'Autour Du Manifeste Pour La Récupération Des Biens Communs'. *Libres savoirs. Les biens communs de la connaissance, Caen, C&F éditions*: 20.
- Terranova, Tiziana. 2000. 'Free Labor: Producing Culture for the Digital Economy'. *Social text* 18(2): 33–58.
- Tiemann, Michael. 1999. 'Future of Cygnus Solutions: An Entrepreneur's Account'. In *Open Sources: Voices from the Open Source Revolution*, O'Reilly Media. <https://www.oreilly.com/openbook/opensources/book/tiemans.html> (October 3, 2020).
- Torvalds, Linus. 2002. 'Linux-Kernel Archive: Re: [PATCH] Remove Bitkeeper Documentatio'. <http://lkml.iu.edu/hypermail/linux/kernel/0204.2/1018.html> (October 2, 2020).
- Torvalds, Linus, and David Diamond. 2001. *Just for Fun: The Story of an Accidental Revolutionary*. Harper Collins.
- Tronti, Mario. 1966. *Operai e Capitale*. Einaudi, Torino.
- Trotsky, Léon. 1920. *Terrorisme et Communisme*. Prométhée Paris.
- Turner, Michael. 1986. 'English Open Fields and Enclosures: Retardation or Productivity Improvements'. *Journal of Economic History*: 669–92.
- Vercellone, Carlo. 2007. 'La Nouvelle Articulation Salaire, Profit, Rente Dans Le Capitalisme Cognitif'. *European Journal of Economic and Social Systems* 1(20): 45–64.
- . 2008. 'La Thèse Du Capitalisme Cognitif: Une Mise En Perspective Historique et Théorique'. In *Les Nouveaux Horizons Du Capitalisme. Pouvoir, Valeur, Temps.*,.
- . 2009. 'André Gorz et La Dynamique Du Capitalisme'. *Cahiers Sens public* (3): 159–75.
- . 2020. 'Les Plateformes de La Gratuité Marchande et La Controverse Autour Du Free Digital Labor: Une Nouvelle Forme d'exploitation?' *Open Journal in Information Systems Engineering* 1(2).

- Wartel, Laurent. 2017. '« Uber a mis en place le rêve socialiste : rendre l'outil de production au travailleur ! »'. *Le Monde.fr*. https://www.lemonde.fr/idees/article/2017/11/06/uber-a-mis-en-place-le-reve-socialiste-rendre-l-outil-de-production-au-travailleur_5210847_3232.html (December 27, 2020).
- 'We Oppose DRM. | Defective by Design'. <https://defectivebydesign.org/> (November 16, 2020).
- Weber, Max. 1905. *The Protestant Ethic and the " Spirit" of Capitalism and Other Writings*. 2002nd ed. Penguin.
- . 1921. 'Economie et Société, Tome 1: Les Catégories de La Sociologie'. *Agora. Plon/Presses Pocket, Paris*.
- Weinstein, Olivier. 2013. 'Comment Comprendre Les «communs»: Elinor Ostrom, La Propriété et La Nouvelle Économie Institutionnelle'. *Revue de la régulation. Capitalisme, institutions, pouvoirs* (14).
- Wikipedia. 2020. 'Geek'. *Wikipedia*. <https://en.wikipedia.org/w/index.php?title=Geek&oldid=988131014> (November 15, 2020).
- Winner, Langdon. 1978. *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*. Mit Press.
- . 1980. 'Do Artifacts Have Politics?' *Daedalus*: 121–36.
- . 1993. 'Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology'. *Science, Technology, & Human Values* 18(3): 362–78.
- Wright, Erik Olin. 2019. *How to Be an Anticapitalist in the Twenty-First Century*. Verso Books.
- Zara, Olivier. 2008. *Le Management de l'intelligence Collective: Vers Une Nouvelle Gouvernance*. M21 Editions.
- Zuckerberg, Mark. 2017. 'Building Global Community'. <https://www.facebook.com/notes/mark-zuckerberg/building-global-community/10154544292806634/>.

Interview with Andrew Feenberg – 3rd of October 2019

In the course of my PhD, I contacted Andrew Feenberg and asked him for an interview. He was kind enough to accept the request and the interview took place via internet on the 3rd of October 2019. The following interview is thus an exclusive and (in my opinion) very interesting document. It gives precisions regarding different aspects of Feenberg's philosophy and political thought: his conception of self-management, his critique of techno-determinism, his regard on the reform/revolution alternative, his look on digital transformations and his analysis of recent social movements. This interview was also an occasion to ask him whether he agrees with my interpretation of his political evolution, to discuss the question of degrowth on which we disagree, and to learn about his relation to Castoriadis. In sum, the interview is well-suited to complement and close my dissertation as it exposes in a clear and simple style Andrew Feenberg's thoughts on some of the main themes it developed.

Ludovic Bonduel: As you may have seen in my chapter, I have the impression that your political positions and your concept of democratic rationalization have slightly evolved over the years to become more moderate. In the article “Subversive Rationalization” published in 1992 you appeared to defend a rather radical, even revolutionary argument in favour of self-management, in line with Herbert Marcuse and the New Left. Whereas, in “Questioning Technology” (1999) you speak of a “technical micropolitics”, and in “Technosystem” (2017) of a “Gestalt switch”, that seem to focus on a multiplicity of specific and limited struggles.

Do you agree that your positions have changed to become more moderate? And, if yes, how would you explain this evolution?

Andrew Feenberg: I don’t agree. Maybe my mode of expression has become more cautious, but I never really believed that I had a formula for revolution. From the beginning, I have argued that we should aim for a self-managed society and that this could, in principle, result from struggles for control over technological decisions and democratization of management in the industrial economy. But only in principle, in other words, I was not predicting anything. I made it clear in my first book on technology that there is no inevitability in that process.

Essentially, what I am arguing is that there are only two ways of organizing people to accomplish work, either you control them from above or they control themselves through some democratic mechanisms. It is not unreasonable for example for managers to attempt to control the workforce. Given their position in society and in the industrial system they have to do that. Otherwise, everything would fall apart because workers don’t have an intrinsic interest in the success of the firm. If the workers had an intrinsic interest, then they could control themselves because they would have a reason to work for the success of the firm. This is a way of understanding the difference between capitalism and socialism: not as a distribution of income, or moral rights, but as a practical matter of how you get things done.

The reason why micropolitics comes in is because these struggles are local. Thus, the question is: can you leap from these local struggles to an overall transformation of the system. I argued in the beginning that this was at least a possibility. And I still hold that view, but I have enlarged the scope of the argument to englobe not just production, but also bureaucracy and markets. And I think that all three domains are domains of control from above that could be modified by social struggles to enable control from below to take over. That does not mean that there would be no management or bureaucracy, simply that the personnel would be chosen by the people they manage or their clients rather than by an instance that represents capital.

Ludovic Bonduel: So, even a self-managed society would have a form of bureaucracy or administration? A self-administration?

Andrew Feenberg: There certainly has to be rules. Of course, how would you imagine running an advanced industrial society without an administration of some sort? But if that administration is responsible to the people it administers, it will have a different character and make different technical choices than if it is completely independent or represents capital or the government – which is itself dominated by capital. Engels wrote an essay about this called “On authority” which is quite interesting. I am not an anarchist in the sense of thinking that everything should become subject to local political decisions at all time, because I think that is quite impractical given the scope and scale of industrial technology.

Ludovic Bonduel: I am a bit surprised that you agree with the argument of Engels in this text, since it is quite determinist and substantivist.

Andrew Feenberg: I don’t think that’s correct. What he says is that under socialism, the industry will be managed by a delegate selected by the workers to the extent that this is possible. Now, why would there be an issue of possibility? Well, perhaps because of the ignorance of workers in the middle of the 19th century who would not be able to understand their own enterprise. Maybe, he also had in mind some deterministic notions about technology, but I don’t think that’s clear at all from the text. In any case, he seems to think that the delegation of authority is a possibility and I think that’s now no longer in question, because I think the population is well-educated by comparison to the mid-19th century and is certainly capable of choosing competent people to run its affairs. You might be right, he may have meant that there were technical imperatives, but I don’t recall him saying that explicitly.

Ludovic Bonduel: Part of the question seems to lie in the level of complexity of modern society: it is the issue of the coordination of the multiplicity of specialized labours and activities. Do you think self-management can be achieved in spite of the current extent of the division of labour?

Andrew Feenberg: Yes, I really don’t see the problem. Right now, companies are run by boards of directors which consists of ordinary, modern, educated people. The fact that they have a lot of money doesn’t make them special in technical terms. People of all kinds are able to get effective help from specialists like doctors, lawyers, teachers etc. In order to delegate authority and to obtain help from professionals, you don’t need to be a professional yourself. You just need common-sense and a minimum of education which most people have now. I don’t think that the problem of self-management is that things are too complicated, because you can find people to help you run complicated institutions. And if they get out of line and show that they are mainly interested in their own wealth and power, you can dismiss them in the context of a democratic system of management. This is not a big problem. The real one is boundaries. There are no longer clear boundaries between institutions. Maybe there never were, but at least people thought there were. They thought that the factory and the city next to it were

two separate entities. However, we now know that the factory pollutes the community and we cannot allow it to function autonomously anymore. Thus, you need representatives of the community to be involved in the management of the factory. You need a more complex system of representation than the ideal of workers' council that came out of the early 20th century in Russia.

Ludovic Bonduel: Do you have an answer to the classical question “reform vs. revolution”: do you think self-management could be achieved without a revolution?

Andrew Feenberg: I have no idea. It's futile in a sense, look where we are: Trump is president of the United States and we are talking about revolution? Clearly, to get anywhere near a socialist transformation will take a long time, lots of intermediary struggles of all sorts, and changes in public attitudes. Who knows what the conditions may be at the point where the overwhelming pressure towards socialism will force capitalism to capitulate? So, I don't think it's fruitful to speculate about that. I think all we can do is say: so long as there are struggles, there are possibilities of improving the society we live in, and perhaps of transforming it radically. I think we should focus on what's real and not worry so much about these speculative possibilities that derive ultimately from very different historical situations. From the French Revolution ultimately: we are still talking of doing what they did in 1789. But everything is different now and our knowledge is very limited. May 68 in France was the last event that looked like it could lead to the overthrow of a government in a democratic, advanced capitalist society. It could have happened, but it would not have been a violent revolution on the model of the French revolution. It would have been a kind of coup, but with popular support. And whether it would have led to socialism is another question entirely. We cannot know where it could have gone.

Ludovic Bonduel: As I know you have written a lot about and even participated to the French events of May 68, I wondered if you had any thoughts to share about the Yellow Vests movement that took place in France last year. Indeed, many comparisons have been made between the two movements. And it is true that, in many respects, the Yellow Vests represent the most significant social movement that happened in France since 1968.

Andrew Feenberg: I was very impressed by the Yellow Vests. I always thought that the French were much smarter about politics than anyone else. Even though they often end up with political leaders that are not a lot better than the others. But somehow there is a kind of basic understanding in the political culture that is remarkable. While populist movements in other countries have easily been manipulated into racist ideologies, these French protesters from the same social origins as people who support populism elsewhere, immediately focused on inequality. And that is quite remarkable, so the Yellow Vests was in fact a very positive phenomenon. However, I was shocked by the violence. It really ruined everything. The

movement could have been much more effective and led to much more significant changes had these fools not engaged in smashing windows. I wonder to what extent this was favoured by the strategies of the government.

Ludovic Bonduel: What do you think of the degrowth movement and critiques of economic growth in general? In “Questioning Technology” you seem to associate economic growth with prosperity and to argue that technological change could reconcile economic growth with environmental imperatives. Do you still believe that? And, isn’t it paradoxical to have such a positive view of economic growth while it amounts to the growth of the technosystem which constitutes a factor of alienation and heteronomy?

Andrew Feenberg: This is a complicated question. Indeed, what do people really mean when they use the word “economic growth”? How do you define it? If you define it in terms of a realistic understanding of the costs of economic activities, you get a very different result than if you just measure profit or market exchanges. Market exchanges leave out all the unpaid labour in society, all the externalities of economic activities, the psychological sufferings of a highly competitive and oppressive economic system. If you take all these factors into account, then your idea of economic growth is quite different from just measuring GDP. You don’t want to cut back the material wellbeing of people, you even want to increase it. But not just the part of it that is effectively measured by market exchanges, it is a much more complete conception of wellbeing that you want to increase. And the result of such growth will certainly be respect for the environment, human health, happiness of individuals etc. That should lead to a very different economy, supported by very different technologies. It will still be an economy that rests on technology and there will still be markets and administrations. Yet, it will serve very different purposes with very different technical means.

I think that the slogan of “degrowth” can have no appeal beyond wealthy people living in big cities who can easily envisage small sacrifices to save the planet. I don’t see how you market that concept to poor people and people in the Third World who need more. Think of life expectancy: is it desirable that life expectancy be increased in poor countries? I think it is. But for that you need technology. So, the question is not whether or not to have technology, but who controls it and for what ends?

Ludovic Bonduel: But don’t you think that to reach such an economy, which would foster all sorts of positive externalities, we would have to somehow limit the size of the market sphere and limit the constant increase of production of commodities?

Andrew Feenberg: Certainly, we would want to limit the market. We don’t want the market to be allocating things like healthcare as it does in the United States, or education. And we can certainly envisage to expand the sphere of non-market goods as we figure out a way to

better measure what people want, without using markets to discover their desires. Let's take the automobiles for example. Right now, the automobile may represent something like 20% of the French economy. These automobiles are very elaborate, they have many functions besides transportation, they exhibit the wealth of their owners, spend a lot of time in garages, cause a lot of accidents since they are made to go fast... There are all kinds of problems with automobiles which are due to the fact that they are private possessions. If automobiles were publicly owned, shared (a bit like these "Autolib" that you can see in Paris), made more accessible and comfortable, their social and environmental costs could be drastically reduced. I think you can imagine many comparable transformations in other domains, that would deliver the good that people most urgently need with far fewer social and environmental costs.

When I was a teenager, I worked with Barry Commoner who is one of the founders of modern environmentalism. One of his fundamental idea was that you have to distinguish between the commodity, the good that is delivered by the technology, and the form in which that good is delivered. The automobile delivers a good: transportation, but in a form that is extremely expensive, environmentally damaging and unnecessarily complex. So, you could envisage the good (transportation) delivered in other ways... Do you understand now why I am not an enthusiastic supporter of degrowth?

Ludovic Bonduel: Yes, it is becoming more and more clear. Still, I am not completely convinced since I have been influenced by many degrowth advocates. By the way, I wonder what you think of Cornelius Castoriadis – who is an important intellectual figure of May 68, a promoter of self-management and whose ideas are close to yours in many respects.

Andrew Feenberg: Well, I met him. I read a bit of his work, not a lot but I really should because he is interesting. Was he a degrowth supporter towards the end?

Ludovic Bonduel: Yes, a bit, and he is very influential within the degrowth movement today. He conceives democracy as self-institution, and for him, self-institution implies the possibility of self-limitation. He considers that the constant development of production is linked to a capitalist imperative while a self-managed economic system would only produce within the limit of the explicit demands of consumers.

Andrew Feenberg: Marcuse also had this distinction between true and false needs. He believed that if we could just serve the true needs people would have a more peaceful life, they wouldn't be in constant competition for more and more etc. I think Marcuse and Castoriadis could have agreed on this idea.

I do agree with Castoriadis that the idea of limit is essential. But limit is not necessarily about quantitative decrease in the amount of goods. It may have to do with decreasing some things while increasing others. Think about the condition of childhood today. Children used to play in

the streets when I was a child. There were bicycles everywhere, we circulated freely. Now children are very restricted in their movements and I think part of the reason is the quantity of automobiles. If you restricted the movements of automobiles, children would have more fun. So, you don't just want limits, you want limits to have meaning and to open possibilities. For Marcuse, the limitation of false needs would open up the sphere of leisure, enabling people to develop their personalities. You know, in California they have a bumper sticker which says: "The one who dies with the most toys wins". That's the point of view of Castoriadis and Marcuse expressed in a bumper sticker.

Ludovic Bonduel: How do you think that the ubiquity of digital technology changes the context in which democratic rationalization take place? You have argued (in "Looking forward, looking backward: reflections on the twentieth century" 2001), that the pervasiveness of digital technologies reduces the possibility of limiting technological expansion from the outside while reinforcing the possibilities of agency from inside the technical sphere. Could you please develop that point?

Andrew Feenberg: Not just digital technology I think, but the whole structure of industrial society has now completely encompassed people's live. So, it's quite implausible that we could somehow distance ourselves from technology. We have to change technology, and from within means: using technology. Indeed, in order to reach a significant number of people today and make changes, we need technology. You know in May 68 we used "Ronéotype" (spirit duplicator) to turn out leaflet – a machine that enables to reproduce multiple copies of a document. That was our principal technology. Ayatollah Khomeini used audio tapes. We used information technology to spread political ideas before the internet. Even Lenin said that the telephone was a great revolutionary instrument, as it allowed revolutionary leaders to communicate with their troops. Technology has been involved in revolutions since the beginning.

Today people's lives are mediated by technology in many different ways, not just in the industrial system, but in the medical system, in leisure activities, in education etc. There is technology everywhere and communication possibilities now follow these mediations. The internet enables people to communicate based on shared interests. For example, patients who suffer from a disease can communicate about the medical system that unites them, that mediate their experience in the same way. Urban problems can be treated now differently because people don't have to all gather in the same place, they can use online resources to communicate. The politics of the internet itself are discussed on the internet by the people it affects. We have transcended localism in a very profound way by, in a sense, making every situation local, or virtually local at least.

Ludovic Bonduel: Local in the sense that everyone can communicate based on their shared interests?

Andrew Feenberg: Right. And those interests are not just subjective, they arise from objectively existing technical mediations. All over the world, the medical system is more or less uniform based on scientific concepts and medical practices that have evolved and been transmitted to medical schools. Thus, a uniform technical system mediates people's experience at a global scale. These people can exchange on the internet about their relation to that system and endeavour to change it. The possibilities of self-management in every life domain are greatly enhanced by the availability of these new instruments of communication. But this is half the story. The other half is the success of powerful actors (such as states or firms) in using the system to spread propaganda and this has become very visible since the 2016 US election – which was manipulated by the Russians.

It took a long time for such actors to figure out how to use the system. They had already of course completely mastered television and the radio. But they were confounded at first, for twenty/thirty years, by the internet. Finally, they did figure out how to control it with the use of bots, malware, targeted advertising techniques, big data etc. Now it is a threat to the internet that we are having troubles countering.

Thus, there are the two sides: on the one hand, enhanced capacities of communication are making self-management more practical in many institutions (not just factories where the workers can join together on the shop floor), and on the other hand, ICTs provide new sophisticated instruments of propaganda.

Ludovic Bonduel: In the early 1980s, Jacques Ellul recognised this ambivalence of ICTs. He argued that on the negative side, there was an intrinsic potentiality of centralisation of power since data banks can only be useful for big actors such as states and large corporations. Though I feel much closer to your philosophy than to his, I still wonder whether he had a point by saying that some technologies may have an intrinsic tendency to push society in a certain direction.

Andrew Feenberg: I wouldn't say intrinsic. It's a potential. Technologies have many potentialities and the question is which ones are actualized under the influence of social forces. There is absolutely nothing inevitable about the use of targeted advertising and the development of propaganda techniques based on it. That was an accident. Actually, no one had thought of this until the managers of Google were pressured by their investors to make some money and came up with this idea. But you could easily imagine a development of the internet in which this would not be possible. In which for example, at the first sign that companies were collecting information, laws would have passed to make it illegal. The whole process that has led to Russian interference would have become impossible.

Ellul's remark is quite prescient but I suspect that what he foresaw was not exactly the manipulation of big data for the purpose of propaganda. I remember that in the 1980s the concentration of information in the hands of big corporations such as IBM was a subject of

discussion and anxiety in France (see Lyotard for instance). They understood that there would be a critical mass of information generated by new technologies, which some actors would possess while others don't, and that it would favour centralisation. But they were mainly focusing on commercial issues, on monopolistic trends for instance. What they did not anticipate is the development of techniques of propaganda based on the data: targeted propaganda based on profiles constructed from private information collected on platforms such as Facebook. I don't remember anyone thinking in terms of propaganda in those days. The internet appeared too decentralized.

Ludovic Bonduel: Do you think the main political issue with the internet today is propaganda? What about surveillance for instance? Did you hear about the social credit system that is being developed in China?

Andrew Feenberg: Yes, surveillance is a threat. It uses the same techniques, only for different purposes. Instead of using them for targeted advertising, it constructs profiles essentially for a sort of policing. It's a potential of the technology that has been actualized in China, but not in France, the USA or Canada. It could be and maybe will. It depends of who wins the elections and what the politics of the time are. Another problem has to do with children, with the effect of the widespread and intense experience of screens in childhood. We don't really know what the implications of that are. Any technology powerful enough to do good can harm. I think of this in terms of ambivalence, of what Stiegler (and before him Derrida), called a pharmakon.

Ludovic Bonduel: It seems that you do not radically distinguish industrial societies from digital societies. Are we still living in industrial societies in your opinion?

Andrew Feenberg: That's true. I don't consider digital developments epic-making in the same way as late 19th century inventions such as the telephone and electricity were. This does not mean I do not find them important or interesting. However, I think there is a tendency to exaggerate the changes occurring in our own time. For instance, take the concept of post-fordism which claims that we are no longer living in industrial societies because work has been transformed to become essentially knowledge-based, white-collar and so on. I think this is a very insufficient analysis of what's happening. All we have done is exporting industrial labour to China. It is still there and done in the same old way. We are not in a post-fordist society, we are just in a margin of the industrial world which benefits from industrial labour in other parts of the globe. Of course, this has consequences but to call this a post-industrial society seems to me fundamentally wrong.

Ludovic Bonduel: Do you think techno-determinist views remain widespread and influential today in the public and academic debate?

Andrew Feenberg: They are certainly much less influential than they used to be. It used to be something that people believed. Now, it is nothing but a convenient ideology. It used to be the orthodoxy that everyone was educated to. Now, it is only a way of justifying decisions that at some level people know are political. For example, climate change will require tremendous technological changes. And people who are in favour of slowing that process down or stopping it talk about the imperatives of technology, the inadequacy of substitute sources of energy and so on. Technological determinism is still worth fighting because it remains influential, especially with economic and political elites who can use it to justify the decisions that they make on other grounds. But it has lost the intellectual battle. There is a whole discipline – Science and Technology Studies – counting thousands of brilliant scholars who have closely studied the history of technology in many parts of the world, and none of them believe in technological determinism. Or, at least as I understand it.